COAL AGE

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Placing the Blame

IT WAS a pathetic scene. Contrasted with the clear, blue sky outside and the noise and bustle inside the railroad station where the final parting took place, it was doubly hard to witness.

The principal character was the former timekeeper for a coal concern. He was starting under the escort of a competent-looking guard for the state penitentiary, where a sentence of three years for embezzlement awaited him. His wife and three small children were present to bid him goodbye. The woman, true to the best of her kind, was straining him to her bosom and crying as only a broken-hearted wife can. The children, too, were tearfully trying to kiss him goodbye, seeming to know that he was not coming back soon. At last the thing was accomplished and the man was hurried to the departing train. His going, though, had wrenched the very heartstrings of all who had witnessed the pitiful scene.

The mother (for she could no longer be called wife) gathered her children together and slowly made her way out into the clear day. But my thoughts, like my eyes, were anything but clear as I watched them start back to the ruined home. I had known the man for years. He had been loyal and honest up to the time of his fall. His guilt was undisputed. He had admitted everything.

I was still wondering what could be done to keep such things from happening when I was startled by a remark from a man standing close by, the manager of a progressive mining concern in the same district. He said:

"That poor fellow is only half to blame. The folks he worked for ought to serve part of his sentence." "What do you mean?" I asked him. "Just what I said," he replied. "Do you know how he started wrong?" I told him I didn't, and then he told me briefly how the thing happened.

"That man was not only the timekeeper at his mine but was paymaster as well. He made up the payroll, sent it to the general office and they sent out the money to him to pay off. No one ever checked his work in any way. He was bonded, it is true, but that in itself doesn't insure honesty.

"Leaving out the details, it is enough to say that he withstood the temptation to do anything wrong for several years. But, as he himself expressed it when caught, it was simply a case of making it too easy for a fellow. He got in a financial pinch, put a straw man on the roll and kept him there two or three years, signing a statement and drawing the money on pay days. He told us he never would have thought of it if the company had been checking his work in any way. He was simply one of those men who are not strong enough to stand this kind of thing. That's why I say the concern should stand part of the blame." There is 100 per cent. of blame to be placed for such crimes and there are hundreds of men today who are just as susceptible and no better guarded against temptation than was this poor fellow.

IT IS *proper to place all the blame at the door of the man who goes wrong if the company has done its best to render temptation negligible. But the concern that makes theft easy, thereby placing a premium on dishonesty, should not be held guiltless.*

How shall we place the blame?

Is it fair to put it all on the weak victim and his innocent family, or should we not split it "fifty-fifty" with the concern and the man?

Safety and Efficiency in Coal Mining

By John Lloyd*

SYNOPSIS—In coal mining, safety and efficiency are mutually interdependent. The greatest obstacles encountered are ignorance and carelessness. These may be overcome only by training and habit. Electricity and the employment of incombustible materials of construction have done much to make present-day mines safer than they were formerly.

Perhaps no subject is of greater importance to the mining industry than that of safety and efficiency. Safety, or freedom from danger, and security to human life, is unquestionably the crowning achievement of efficiency.

Safety is something of a very personal nature; it is personal insurance. Adherence to its principles cannot be thrown on and off as a cloak, nor can it be delegated to another. To be safe one must think safety constantly, make it the result of unconscious effort and one's second nature. Hence education upon the subject is of first importance. It is the prime educational factor, for without it and the habits it inculcates the inevitable accident may occur.

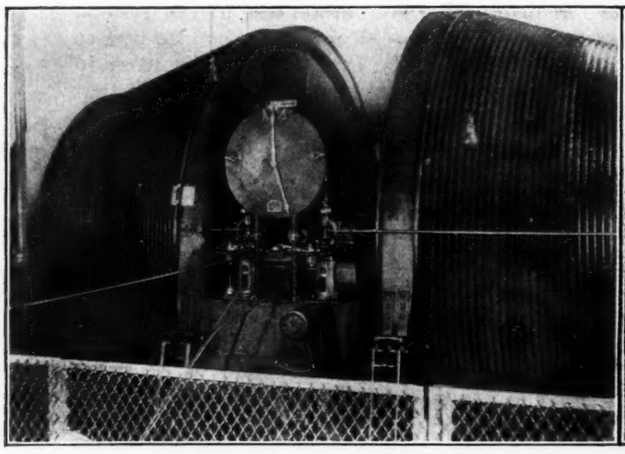


FIG. 1. OVERWINDING AND OVERSPEEDING DEVICE ATTACHED TO A HOIST ENGINE

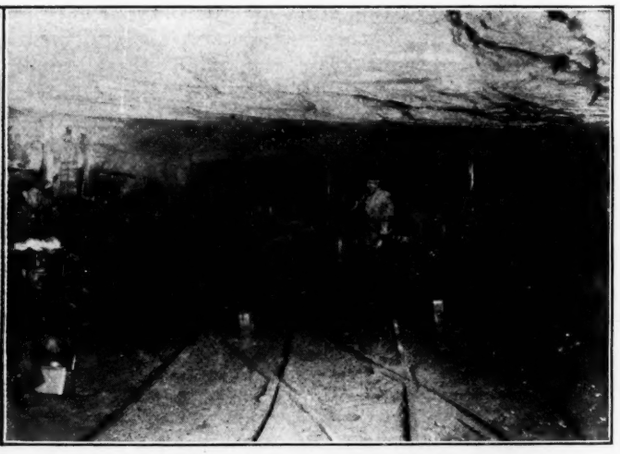


FIG. 2. SAFETY GATES AT AN INTERMEDIATE SHAFT LANDING

Every move for increased efficiency underground must be taken with due consideration for the safety of the workman. It is known to be a fact that mine managers, superintendents and foremen are and have been for many years vitally interested in the well-being of their workmen. In corroboration of the above I quote from the 1907 report of the Department of Mines of Pennsylvania as follows: "The Pennsylvania mining industry is in most excellent condition, the equipment and management of most of the mines are up to date, and great effort has been made in recent years to render the mines safe for the workmen and at the same time to give better protection to property."

Strict compliance with the mine laws would probably help to reduce accidents, were noncompliance with these laws the only contributory cause. Such, however, is not always the case, and a study of statistics will show that a large percentage of accidents arises from carelessness and ignorance on the part of the injured person. Legislation will not and cannot eliminate accidents that are the result of carelessness. This must be corrected through education.

Safety education is being promulgated in a general way through the posting of safety signs and the distribution of booklets containing instructions and safety regulations for the guidance and protection of employees. Danger signals and guide signs are now posted where such signs, a few years ago, were considered unnecessary. Tracks are kept in better condition than ever before. Fifteen years ago machinery was considered well guarded, but the precautions then taken would not be considered adequate now or in keeping with the modern slogan of "safety first."

The great problem that confronts us all is self-interest. How often can the reader recall having cautioned his neighbor regarding a dangerous practice only to be told that this certain work had always been done in that manner. Safety guards are often removed by careless workmen for the purpose of making repairs and adjustments, with no thought of replacement after the cause which necessitated their removal has been corrected.

What has been done to safeguard the workman at the face? This can be answered briefly by stating that the conditions existing there have not materially changed. The system of mining now followed is about the same as regards the condition of roof and working place as was the case in the early days of the industry. It is largely left to the judgment of the miner whether his place is safe or not, notwithstanding the fact that the foreman or his assistant visits each working face several times a day. The treacherous nature of the roof requires that the miner must be ever on the alert, for conditions change rapidly after the top has been exposed to the air. The miner is slow to adopt safety suggestions and will even persist in working under a bad top after being warned of his danger.

The foreman will tell a miner before he enters his place in the morning that he has a suspicious-looking roof and will instruct him to secure the top roof or take it

*Lehigh Valley Coal Co., Wilkes-Barre, Penn.

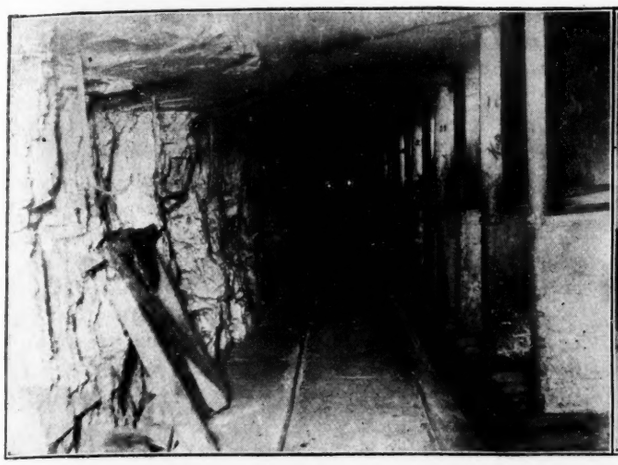


FIG. 3. A MULE BARN OF FIREPROOF CONSTRUCTION

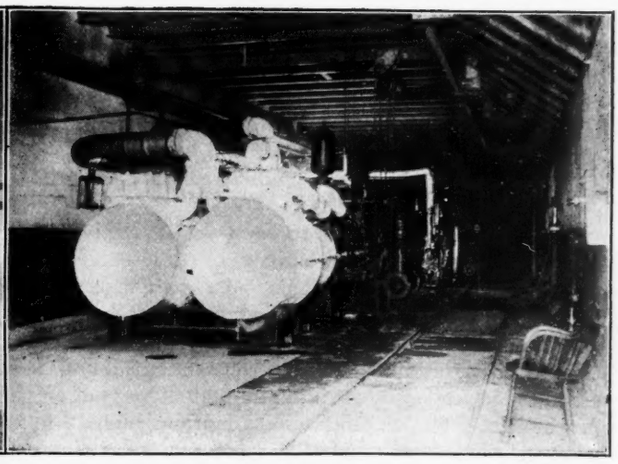


FIG. 4. A MODERN PUMPING STATION OF LARGE CAPACITY

down before doing anything else. Several hours afterward the foreman may visit the place and find the miner and his laborer working under the roof about which he was cautioned in the morning. Or the foreman may find that the accident which he anticipated has already happened. The most difficult condition to overcome is human carelessness.

In the early days of the mining industry, transportation was confined to men and mules or horses. In those days transportation roads were short; but as time passed and distances grew, it became necessary in order to keep down the cost to introduce some mechanical motive power. The steam locomotive was first introduced into the mines, using coal as a fuel. Then followed compressed-air locomotives. Both of these motive powers are now in use.

In the amount or volume of work done at the present day the mule is probably in the lead, with electricity a close second. The steam locomotive has largely disappeared, while compressed-air machines are giving way to those electrically driven. It is doubtful if electricity will ever eliminate mule transportation entirely, but without abandoning any of the established methods of transportation, electricity because of the flexibility of its application will take the lead in the not far distant future.

Statistics compiled by the Department of Mines of Pennsylvania for the past 17 years show that fatal accidents by cars have increased approximately 68 per cent., while in the same period the tonnage output has increased about 51 per cent. The various changes in the method of transportation may be one reason for the increase in fatalities, but a study of statistics would indicate that a large percentage of the accidents could have been avoided if the injured had exercised caution.

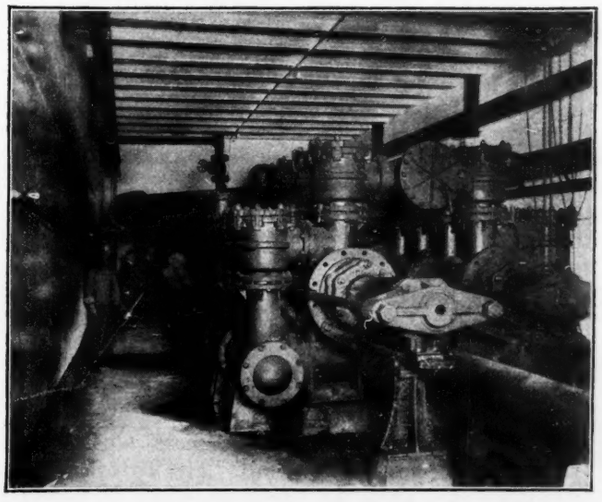


FIG. 5. THE WATER END OF A LARGE PUMP

The photographs accompanying this article will show some of the safeguards placed about the workmen. Fig. 1 is a partial view of a shaft hoisting engine showing the winding drums and the speed and distance governor, or what is commonly known as an overwinding device.

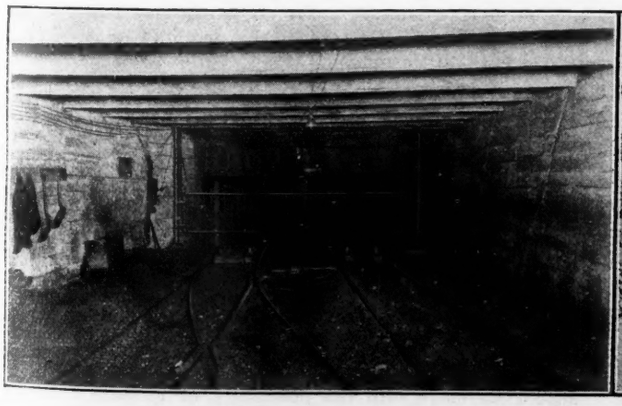


FIG. 6. LANDING GATES AT FOOT OF SHAFT

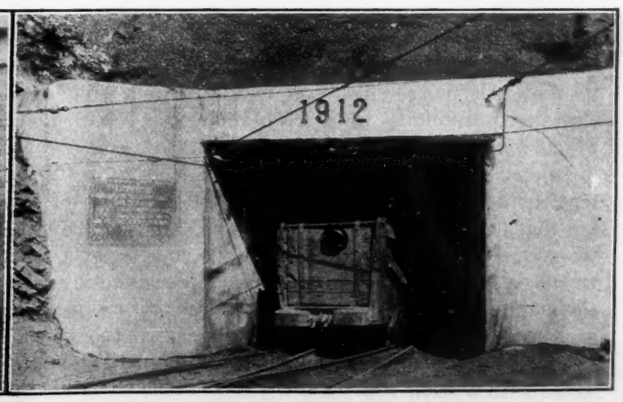


FIG. 7. AUTOMATIC TRIP ALARM ON CAR

Should the engineer become suddenly ill while the engine is in motion and the nature of his illness be such that he would lose control of the engine, this device will automatically bring it to a stop when the cage is at a safe distance from the sheave wheel. This device will also prevent running at a reckless speed.

Ventilation Is Important

As a general rule mines are well ventilated. The air current in most operations is maintained by one or more centrifugal ventilators or fans. Machines of this type which have been recently installed are much superior in design and efficiency to those formerly placed in operation. Modern machines supply a constant current of fresh air to every portion of the mine through airways of ample proportions. The efficient foreman prides himself upon a properly ventilated mine.

The electrical industry has contributed more to the safety and efficiency of mining than is generally supposed. In the order of their adoption the more important electrical devices contributing to safety are, first, the electric-signal system; next, the telephone, which is merely an extension of the signaling system; following these come the electric light and the electric motor.

The electric signal which may consist of a bell or a flash-light, contributes to the safety and efficiency of mining by sending or receiving signals or important communications quickly. The electric light has no rival for general illumination, and it improves the mine air in so far as it replaces oil-burning lamps. The electric locomotive when mules are disposed of will contribute toward improved ventilation as well as efficiency.

Electric apparatus, if not properly installed, maintained and operated, may become a menace to safety and efficiency. The first and most important consideration in connection with electric equipment is insulation, and good insulation is more difficult to maintain in a mine than elsewhere, especially in a damp and wet place, under which condition deterioration is rapid.

Telephones and signals are not as a rule given the attention their importance requires. Another form of signal that has contributed largely to the safety of the mine worker is the pneumatic signal. This consists of a tube, usually a 2- or 2½-in. wrought-iron pipe, extending from the engine room to the bottom of the shaft or slope. At each level and in the engine room the signal tube is connected with a small hand-operated air pump that is provided with a small whistle and a bell. This signaling apparatus is very simple and is more reliable than any other form now in use. This same pipe is also used as a speaking tube. Fig. 2 shows an intermediate shaft landing where substantial safety gates and car stops are plainly visible.

Those who are in charge of a mine or a section of a mine should be ever on the alert for dangerous places. Electric wiring should be carefully and substantially protected at all crossings. All signals should be kept in perfect condition. Mine telephones, which are of prime importance, should always be in proper working order, because at the time of an accident quick communication with the surface may mean the saving of human life. Occasionally the telephone service of an entire mine is found to be out of order for several days at a time. This is due to a lack of interest on the part of the men in charge.

Those who are in charge of work and who are given men and materials to work with should manifest a personal interest in the use of their implements and should also take personal pride in seeing that all equipment is in first-class working condition at all times.

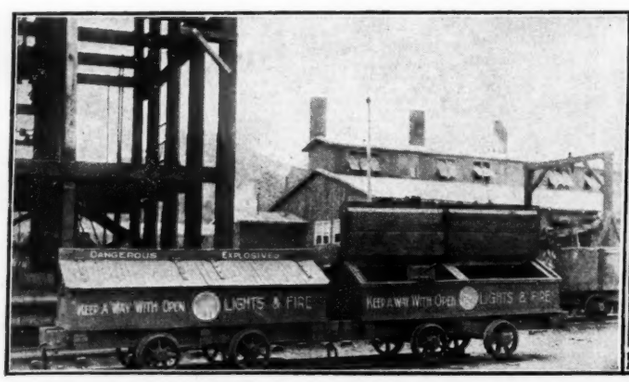


FIG. 8. SPECIAL CARS FOR EXPLOSIVES

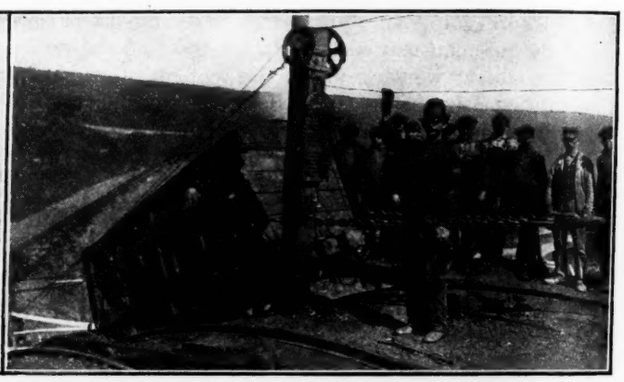


FIG. 9. SPECIAL SLOPE PASSENGER CAR

The fire risk underground is much less now than it was a few years ago. Mule barns, see Fig. 3, are now constructed entirely of fireproof materials, which surpass from the standpoint of safety as well as that of sanitation the conditions existing a dozen years ago. Pumprooms, engine houses, shaft landings and approaches are protected by steel and concrete construction. All these improvements have helped to reduce accidents from fires, since today the inside building and main entrances are constructed of noncombustible materials.

Fig. 4 shows a modern pumping station, with a capacity of 2,500 gal. per min. Notice the substantial concrete and steel construction. Fig. 5 is another pumping station of the same capacity as the one in Fig. 4, showing the water end of the pump.

The Distillates of Coal are essential to many industries, and yet only about 20 per cent. of the coal output of the United Kingdom is at present carbonized and the whole of the tar, ammonia and benzol contained in the remaining 80 per cent. is therefore lost. Coal operators in America should give this matter close attention. What it means may be realized by quoting Sir William Garforth before the Institution of Mining Engineers. Take his estimate of 5,000,000 tons of coal burnt in beehive ovens without obtaining the recovery of the byproducts. "This quantity alone represents a loss of 70,000 tons of ammonium sulphate, 250,000 tons of tar and 12,000,000 to 15,000,000 gal. of benzol, all of which could be saved if the coal were distilled in retort ovens." In connection with the distillation of coal he suggests that inquiry should be made into the possibility of utilizing the waste gases from byproduct ovens.

"Set-Over" Tables for the Mine Transitman

By F. C. Sanner

Most mine transitmen are only too familiar with the inconvenience and delay caused by entries being driven off the line of sights. After advancing the survey to the face of the entry and devoting considerable time to calculating not only the centers at the last station, but also the direction in which the sights should be set in order to get the entries back to their proper centers at some suitable distance, the transit must be set up at the last station to put in the sights. When the entries have been driven the proper distance to bring them to the desired centers, the transitman is again compelled to make two set-ups in order to put the sights in on the projected line.

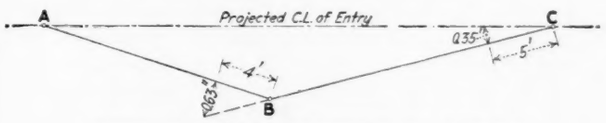
These tables make it possible to advance the survey in one direction and set the sights in another, making only one set-up of the instrument. They also reduce to a minimum the time spent on calculations. With a competent chainman the transitman can be setting up at another place while the chainman puts in the sights at the offset distance as given by the transitman before departing.

In the following description of the use of these tables the station will be used as one of the sights; also, the station will be the nearer to the face of the entry and the sight outbye from the station.

Assume that on setting up at station *A*, after putting in station *B*, also marking a point of this line 4 ft. from *B*, it is found that the entry has been driven 5 deg. to the right of the direction in which the sights have been set; also that the distance from station *A* to station *B* is 160 ft. Referring to Table 2 on the line marked 160 ft. and the column marked 5 deg., it will be found that station *B* is 13.94 ft. to the right of the projected center line.

It will be assumed now that it is desired to turn the entry to the left to get back on the projected center line at 200 ft. from station *B*. Referring again to Table 2 on the line marked 200 ft. and following the line until we come to the distance nearest 13.94 ft., we find this to be 13.95 ft. in the column marked 4 deg. Hence from the line between station *A* and station *B* it will be necessary to put in a sight 5 deg. plus 4 deg., or 9 deg., to the left. The line from station *A* to *B* was marked at 4 ft. from station *B;* referring to Table 1 on the line marked 9 deg. and column marked 4 ft., we find the set-over to be 0.63 ft. Since the entry must swing to the left, we measure from the point 4 ft. from station *B* at right angles and on the right side of the line, the distance 0.63 ft. and put in the sight. This sight used with station *B* is the desired direction.

After the entry has been driven the 200 ft., a station, *C*, is put in at that point and the line *B* to *C* marked, say, 5 ft. outbye from station *C*. Referring now to Table 1 on the line marked 4 deg., that being the angle between the projected direction and the line between *B* and *C* and column marked 5 ft., we find the set-over to be 0.35 ft. The entry must now, of course, be turned to the right; hence we measure from the mark on the line *B* to *C*, at right angles and on the left side, a distance of 0.35 ft. to put in the sight. This sight with station *C* will be the required direction.



SKETCH SHOWING ADAPTION OF TABLES

Table 1 was figured by using the tangents of the various angles for the different distances and Table 2 by using the sines of the various angles for the different distances.

It is not necessary to lay off the right angles, as they can be estimated close enough for sight work, but ordinary care should be used in making the set-over. Should the sight be placed ahead of the station, the set-over would be on the same side of the line as you desire to have the entry driven, although the sight line will not fit in the entry quite so well. Hence the station should be put in as close to the face as conditions will permit. The customary care must be exercised in obtaining the proper angles.

The tables here given may not be exactly adaptable to all mines, but they can be easily changed to suit local conditions. They may be put on tracing cloth of such shape and size that the blueprints made therefrom can be neatly folded and carried in the transit books.

TABLE 1. OFFSET DISTANCES

	3′	4′	5′		3′	4′	5′
1°	0.05	0.07	0.09	23°	1.27	1.70	2.12
2°	0.10	0.14	0.17	24°	1.34	1.78	2.23
3°	0.16	0.21	0.26	25°	1.40	1.87	2.33
4°	0.21	0.28	0.35	26°	1.46	1.95	2.44
5°	0.26	0.35	0.44	27°	1.53	2.04	2.55
6°	0.32	0.42	0.53	28°	1.60	2.13	2.66
7°	0.37	0.49	0.61	29°	1.66	2.22	2.77
8°	0.42	0.56	0.70	30°	1.73	2.31	2.89
9°	0.48	0.63	0.79	31°	1.80	2.40	3.00
10°	0.53	0.71	0.88	32°	1.87	2.50	3.12
11°	0.58	0.78	0.97	33°	1.95	2.60	3.25
12°	0.64	0.85	1.06	34°	2.02	2.70	3.37
13°	0.69	0.92	1.15	35°	2.10	2.80	3.50
14°	0.75	1.00	1.25	36°	2.18	2.91	3.63
15°	0.80	1.07	1.34	37°	2.26	3.01	3.77
16°	0.86	1.15	1.43	38°	2.34	3.13	3.91
17°	0.92	1.22	1.53	39°	2.43	3.24	4.05
18°	0.97	1.30	1.62	40°	2.52	3.36	4.20
19°	1.03	1.38	1.72	41°	2.61	3.48	4.35
20°	1.09	1.46	1.82	42°	2.70	3.60	4.50
21°	1.15	1.54	1.92	43°	2.80	3.73	4.66
22°	1.21	1.62	2.02	44°	2.90	3.86	4.83

TABLE 2. CORRECTIONS FOR VARYING ANGLES AND DISTANCES

	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	
20′	0.35	0.70	1.05	1.40	1.74	2.09	2.44	2.78	3.13	3.47	3.82	4.16	20′
30′	0.52	1.05	1.57	2.09	2.61	3.14	3.66	4.18	4.69	5.21	5.72	6.24	30′
40′	0.70	1.40	2.09	2.79	3.49	4.18	4.87	5.57	6.26	6.95	7.63	8.32	40′
50′	0.87	1.74	2.62	3.49	4.36	5.23	6.09	6.96	7.82	8.68	9.54	10.40	50′
60′	1.05	2.09	3.14	4.19	5.23	6.27	7.31	8.35	9.39	10.42	11.45	12.47	60′
70′	1.22	2.44	3.66	4.88	6.10	7.32	8.53	9.74	10.95	12.16	13.36	14.55	70′
80′	1.40	2.79	4.19	5.58	6.97	8.36	9.75	11.13	12.51	13.89	15.26	16.63	80′
90′	1.57	3.14	4.71	6.28	7.84	9.41	10.97	12.53	14.08	15.63	17.17	18.71	90′
100′	1.75	3.49	5.23	6.98	8.72	10.45	12.19	13.92	15.64	17.37	19.08	20.79	100′
110′	1.92	3.83	5.78	7.67	9.58	11.50	13.40	15.31	17.20	19.10	20.99	22.87	110′
120′	2.09	4.18	6.28	8.37	10.46	12.54	14.62	16.70	18.77	20.84	22.90	24.95	120′
130′	2.26	4.53	6.80	9.06	11.33	13.58	15.84	18.09	20.33	22.58	24.81	27.03	130′
140′	2.45	4.88	7.33	9.76	12.20	14.62	17.06	19.48	21.90	24.32	26.72	29.11	140′
150′	2.61	5.23	7.85	10.46	13.07	15.66	18.28	20.87	23.47	26.06	28.63	31.19	150′
160′	2.79	5.58	8.37	11.16	13.94	16.72	19.50	22.27	25.03	27.78	30.53	33.27	160′
170′	2.97	5.93	8.90	11.86	14.82	17.77	20.72	23.66	26.59	29.52	32.44	35.34	170′
180′	3.14	6.28	9.42	12.56	15.69	18.82	21.94	25.05	28.16	31.26	34.35	37.42	180′
190′	3.32	6.63	9.95	13.25	16.56	19.86	23.16	26.44	29.72	32.94	36.25	39.50	190′
200′	3.49	6.98	10.47	13.95	17.43	20.91	24.37	27.83	31.29	34.73	38.16	41.58	200′

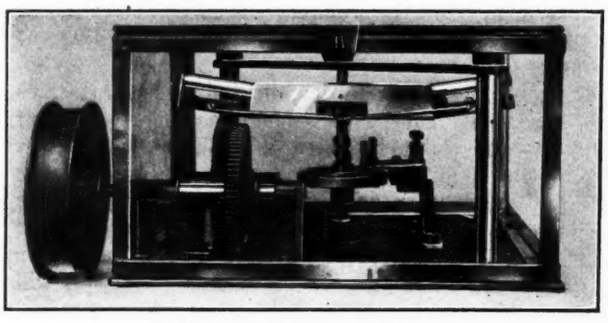
The Satisfactory Working of Any High-Speed Machine is settled by the following four points, according to J. A. McLay: (1) Foundations and grouting-up; (2) level and alignment; (3) coupling; (4) connections. He says they are of equal importance. Standard high-speed machines, such as turbine pumps, fans, motors, etc., are designed to be mounted on solid foundations of concrete, brickwork, masonry or steel construction, and they should not be set up on temporary foundations, such as timber, without first consulting the makers.

Hoisting-Engine Signals*

SYNOPSIS—It is now necessary at British collieries to employ a signaling device that will indicate visually to the hoist engineer the nature of the hoist that is to be performed. A device of this kind, which is actuated by a solenoid, is here described.

At the coal mines in Great Britain it is now required that "in connection with every hoisting engine there shall be provided an appliance which shall automatically indicate in a visible manner to the hoisting engineman (in addition to the ordinary signal) the nature of the signal that is to be complied with."

This is in accord with Home Office general regulation No. 95, and it is now imperative upon all colliery companies to adopt a uniform code. This code has to be given to the hoisting engineer in both a visible and an aural form. A simple plan recommended is to provide an indicator upon the dial of which all signals are



CONTACT MAKING RELEASE

inscribed and over which a hand traverses step by step, pointing to the nature of the hoist.

The apparatus usually employed consists of a lever which, to make contact, must be pulled forward instead of being compressed. This is arranged to avoid accidental contact by leaning on the lever or otherwise inadvertently bringing the apparatus into action. Two such contact makers are required for the bottom cager, one actuating the cautionary signal "men" and the other actuating the executive signals.

The operating mechanism consists primarily of a solenoid surrounding a rod of steel, which plunges upon electrification of the coil. The plunger is thus sucked or drawn up rapidly and strikes a gong with a clear and loud note. It also carries a pawl that engages in a ratchet and on each rise of the rod carries a hand one step over a dial. The dial over which the hand travels step by step contains the nature of the signal, as follows: One, raise or stop; two, lower; four, raise steadily; five, lower steadily. These are the executive signals.

To indicate the cautionary signal "men" and to avoid what is known as a "cumulative" signal, a separate plunger and solenoid are provided in the same ease. The plunger sounds a gong that is common to both strikers. This second plunger also carries a pawl which engages in a second ratchet, and on each rise of the rod carries a flag upon which is painted the word "men." This flag travels behind the dial and at the third stroke on the gong appears in an open space cut in the dial. Thus the bottom and top cagers can communicate to the hoisting engineer the cautionary signal "men" in addition to any of the required executive signals from one to five.

Two indicators are fixed in the engine house, one operated by the bottom and the other by the top cager. The indicator can be released in various ways, but the most favored arrangement is for the engine to effect this automatically. Although the release can be either electrical or mechanical, the former is quicker in action when operated in conjunction with the apparatus described.

The contact making release, shown in the accompanying illustration, consists of an upright shaft carrying on each side two arms. These arms are composed of metal tubes, starting and ending with nonconducting material and forming a groove or cage within which metal balls rest and roll. The upright shaft is driven through gearing from any convenient shaft of the hoisting engine. A slight movement of the engine causes a considerable movement of the arms, and the balls travel outward by centrifugal force in their ball races. In so doing they complete an electric circuit, which actuates a solenoid provided in the indicator case. This solenoid releases a pawl.

Thus on the hoisting engine being started, the indicator is cleared of its signals, and the pointer and flag return to zero. As the contact making release will work with the starting or stopping of the hoist, it is of service in signaling during shaft repairs. When the engine stops, the balls gravitate in the race and again clear the signal, so that it is impossible to accumulate and register incorrect signals.

Where the cages have two or more decks, the contact making release is so arranged that the flag remains visible during the decking of "men," while the executive signal is released at each change of deck.

The two arms of the ball races are separately adjusted in regard to their angles of inclination. Consequently, it is easy so to adjust this device that the signals may be cleared at any desired point in the hoist by making more or less steep the incline up which the balls travel. One may be connected to clear the cautionary and the other to clear the executive signal, or both may clear the signals simultaneously.

The contact making release, although primarily devised for installation with the visual signals, is a self-contained and independent unit of mechanism and may be adapted to any and every electric system of signaling indicators.

*Summary of paper presented by Wilford H. Davis at a meeting of the North of England Institute of Mining and Mechanical Engineers.

The Treatment of Coal Dust, demonstrated by Mr. Belger, of Newcastle-on-Tyne, consists in spraying the roof, sides and floor with a viscous fluid, into which the dust particles will sink. It must be converted into a pasty mass, from which it cannot be separated; must not dry at ordinary temperatures, and if exposed to high temperatures ought to cake and not fall to powder. A special sprayer is fixed to the vessel containing the material, and by means of a brush that comes from the nozzle, the dust can be rapidly and easily dislodged, being then seized by the liquid. As the result of demonstrations, it is claimed that this method will afford absolute safety from coal-dust explosions, that the consequences of short-circuiting will be diminished, and that fires will be localized.

Rating of Mine Locomotives

By R. E. Hellmund and W. A. Clark*

SYNOPSIS—This article is intended to be of assistance to the operator who is in the market for mine locomotives. For this purpose an outline of the important considerations in connection with the rating of such machines is given.

On account of the particular characteristics of an electric motor it is possible to introduce many different ways of rating these machines. This fact, in turn, is liable to be misleading to the purchaser of an electric mine locomotive, who, as a matter of course, cannot be familiar with the details of the design or the characteristics of electric motors. It is, therefore, proposed to give here a simple outline of the important features to be considered with regard to rating in the selection of mining locomotives in order to enable the purchaser to choose a locomotive which is best adapted to perform the desired work at a minimum cost, and to see for himself as to whether he is getting his money's worth.

There are certain fundamental considerations which determine the rating of a mine locomotive. The tractive effort, which means the pulling force of the locomotive, and the speed fix the horsepower developed. This consequently increases with the tractive effort and the speed of the machine. In fact, it is possible to calculate the horsepower of a locomotive by multiplying the tractive effort in pounds by the speed in miles per hour and dividing by 375. On the other hand, if the horsepower and speed are known, the tractive effort may be found by multiplying the horsepower by 375 and dividing by the number of miles traveled per hour. Finally, if the horsepower and speed are known it is possible to find the tractive effort by multiplying the horsepower by 375 and then dividing by the speed.

The operator of the locomotive is usually most interested in the tractive effort or pulling force of the machine, because it is this tractive effort which determines the size of the train which he can handle successfully. The rated speed of the locomotive should usually be rather low, because with the conditions prevailing in mining work, it is not ordinarily possible to take advantage of high speeds. In view of the frequent stops and slow-downs necessary in mining work, it is more important to have a locomotive which can start up quickly with a heavy train than it is to have one which can run at high speed for any great length of time. The ability to get under way quickly does not depend, however, on the rated speed of the motor, but rather upon the tractive effort or the pulling force which the locomotive is able to exert.

While, of course, the local conditions have some influence upon the relative importance of rated tractive effort and rated speed, it may safely be stated that in a large majority of cases the locomotive with the larger tractive effort or pulling force is the one that hauls the greater amount of material in a given time with a minimum consumption of power.

For this reason, the operator should be careful not to be misled by a high horsepower rating if that rating is obtained by a high speed of travel. He should be careful to investigate as to whether the high horsepower is obtained on account of high speed, or through a large tractive effort, and in practically all cases he should give preference to the locomotive with the higher tractive effort.

*East Pittsburgh, Penn.

Power Consumption

It is not only advisable for the operator to prefer the locomotive with the higher tractive effort and low speed to the one with a lower tractive effort and higher speed having the same horsepower rating, but he should even be cautious in buying a locomotive with a high horsepower rating if such rating is obtained on account of high speed.

The reason for this is that a high horsepower rating means increased power consumption without increasing the amount of work done by the locomotive, if the high rating is obtained through high speed. This may be made clearer by stating, for instance, that a 15-hp. locomotive with a rated speed of—say 9 miles per hour—will take 50 per cent. more current for starting a certain train than a locomotive with a 10-hp. rating with a rated speed of 6 miles per hour.

It is evident from this how misleading a mere consideration of the horsepower rating of the locomotive may be. In the particular instance given above, the purchaser might think that he is getting a locomotive which will do 50 per cent. more work when he buys a 15-hp. locomotive instead of a 10-hp., while actually he would not be able to pull any more with such a machine and would at the same time pay for his mistake in higher current consumption. As a matter of course, there are certain limitations in speed, below which it would not be advisable to go, because if this is chosen below certain limits, the work done by the locomotive would be reduced. As a general rule, best results in mining work are obtained with speeds of 6 miles per hour, at the one-hour rating of the locomotive up to 10 tons, and 7 to 8 miles per hour for larger machines.

In this connection, attention should be called to the fact that the speed at the rated one-hour load does not represent the maximum running speed of the locomotive. Even with the heaviest train which can be handled, the actual running speeds which may be obtained are usually 30 to 40 per cent. greater than the one-hour rated speed, because the pull which is required after the train is once under way is usually much less than the one-hour pulling force or tractive effort.

Methods of Rating Electric Locomotives and Motors

It will be noticed that in the above discussion, mention is made of the rated horsepower and the tractive effort, also speed at the rated horsepower. The question, therefore, arises as to what is to be understood under the rated horsepower of an electric motor. In this connection, it should be remembered that there is practically no limit to the maximum rating possible with motors on mine locomotives, because any uptodate tractor is usually able to exert enough torgue for slipping the wheels

under almost any condition of rail and the only effect which such a maximum possible load has upon the machine is that it heats up the motor. In addition, it usually causes excessive sparking in case of non-commutating pole machines, but even this, if not carried on too long, will not make the motor inoperative, but merely have a harmful effect upon the commutator, brushes, etc.

The principal circumstance, therefore, by which the rating of an electric motor is limited is the admissible temperature rise. This limit is due to the fact that the windings require insulation, which, if heated above certain temperatures, will roast out and deteriorate. After years of experience and investigation it has been found fairly conservative to permit a maximum temperature rise of 75° C. at the rated load of motors used in traction work of all kinds. Consequently, all ratings of mine locomotives should be based on such a temperature rise on the stand tests of their motors. The heating is caused by certain electric and magnetic losses inside the motor which increase with the load on the machine.

This means that the temperature rise in the motor will be the higher the larger the load. Insofar, however, as a machine of this kind has a certain amount of heat capacity or ability to absorb heat, it is evident that it is possible to put on a heavy load for a short period of time without exceeding a given temperature rise, while if the load is of longer duration, its amount has to be much smaller if this temperature rise is not to be exceeded. For this reason, it is possible that one and the same motor may be rated 16 hp. for 15 minutes, 13 hp. for 30 minutes, 11 hp. for one hour, and possibly 5 hp. continuously.

It is evident, therefore, that a purchaser of a locomotive may easily be misled regarding what he is getting if he does not obtain from all bidders complete data regarding the figures on which the motor rating is based. It may easily occur that one manufacturer offers a 13-hp. rating for 30 minutes, while another one would offer an 11-hp. motor for 60 minutes, and the purchaser might be under the impression that he gets a better value in buying the 13-hp. machine, while he actually may receive a worse one.

Standard Rating of the A. I. E. E.

In order to avoid such confusion, the American Institute of Electrical Engineers has definitely standardized the matter of rating railway motors as follows:

Nominal Rating: The nominal rating of a railway motor shall be the mechanical output at the car or locomotive axle, measured in kilowatts, which causes a rise of temperature above the surrounding air by thermometer, not exceeding 90° C. at the commutator, and 75° C. at any other normally accessible part after one hour's continuous run at its rated voltage (and frequency in the case of an alternating-current motor) on a stand with the motor covers arranged to secure maximum ventilation without external blower. The rise in temperature as measured by resistance shall not exceed 400° C.

The statement of the nominal rating shall also include the corresponding voltage and armature speed.

Continuous Rating: The continuous rating of a railway motor shall be the input in amperes at which it may be operated continuously at one-half, three-fourths and full voltage, respectively, without exceeding the specified temperature rises, when operated on stand test with motor covers and cooling system, if any, arranged as in service. Inasmuch as the same motor may be operated under different conditions as regards ventilation, it will be necessary in each case to define the system of ventilation which is used. In case motors are cooled by external blowers, the volume of air on which the rating is based shall be given.

It is, however, standard practice on mine-locomotive motors to give the rating in horsepower at the armature shaft, that is, excluding gear and other transmission losses, and also to give the continuous rating at 60 per cent. and 80 per cent. of the normal voltage.

In spite of this existing standardization, it has frequently happened that certain manufacturers have sold motors on the basis of 40-min. ratings, or the like, without definitely stating this to the customer.

It will be noted in the above that the continuous rating of railway motors is to be given in amperes. This method may not be quite convenient to the operator, who possibly is more accustomed to think in tractive effort or pulling force than in electrical units. Insofar as it is an easy matter for the manufacturer of the motor to give the continuous rating in pounds of tractive effort, as well as in amperes, it is wise for the purchaser to request both figures.

The continuous ratings on two motors of the same nominal rating may be very different as was shown in the article on "Commutating Poles for Mine Locomotive Motors," by J. C. Barry in the issue of *Coal Age* for Oct. 10, 1914, therefore, it is often misleading to judge motors only by the one-hour rating.

How To Buy a Mining Locomotive

In view of the above numerous possibilities for being misled, it seems advisable for the buyer of a mining locomotive to request from the manufacturer the following information regarding the rating:

1. Weight of locomotive.

2. Will the motor be able to slip the wheels of the locomotive at all conditions of rail?

(These two questions will definitely determine the maximum tractive effort which the locomotive is able to exert.)

3. What is the one-hour rating of the locomotive according to the standardization rules of the A. I. E. E. based on a temperature rise of 75° C. on stand test of the motors?

4. What are the tractive effort and speed of the locomotive at the one-hour rating?

5. What is the continuous ampere rating of the motors on stand test at one-half and three-fourths of the rated voltage, and what tractive efforts correspond to these ratings; all based on 75° C. temperature rise on the stand according to the standardization rules of the A. I. E. E.?

By securing all of the above information and comparing same for the various locomotives in the market, the purchaser will be in a position to know what he is actually buying. Without it, he is liable to purchase almost anything without knowing just exactly what he is getting.

It may be advisable to cite here one of the many cases where customers have been misled by not taking a little time in getting the above information. At a certain mine, tests were made on three locomotives of different manufacture. One was a 15½-ton machine with motors rated at 185 hp. total, one was a 17-ton locomotive with motors rated at 200 hp. total, and the third was a 16-ton locomotive with motors rated at 210 hp. total. After an all day run, in which the number of car-miles hauled were practically the same, the temperature rises on the motors were as follows:

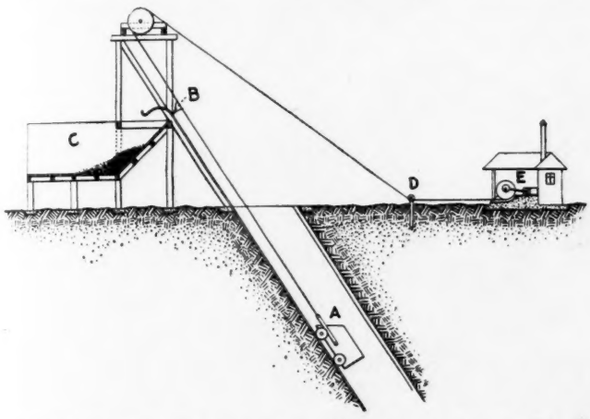
15½-ton locomotive, rated 185 hp., field 52° C., armature 63° C.
17-ton locomotive, rated 200 hp., field 56° C., armature 65° C.
16-ton locomotive, rated 210 hp., field 86° C., armature 85° C.

In other words, the locomotive with the smallest horsepower rating in this case proved to be the best of the three in actual service, while the machine with the highest horsepower rating not only showed up to be the poorest of the three, but even had temperature rises exceeding safe limits. This would mean a short life for the motor insulation and windings.

Headframe for Inclined Shaft

A mine recently reopened in Virginia was entered by an old inclined shaft dipping at an angle of 55°. It was decided to put the hoisting plant on the hanging-wall side of the shaft rather than in the usual position on the foot wall. This was deemed necessary on account of the situation of the mill and waste pile, says F. W. Foote in *The Engineering and Mining Journal.*

A headframe was built of native timber, as shown in the accompanying illustration. Its diagonal legs rested on the shaft collar set. which was a monolithic concrete



HEADFRAME WITH HOIST ON OPPOSITE SIDE OF SHAFT

block, while the posts were set on concrete piers set in the foot wall. The legs were given the same slope as the shaft and carried the track. The skip *A*, which was a wooden affair built on the property, ran up to the point *B*, where it dumped into an ore bin *C*, which was made an integral part of the headframe. An idler *D* kept the hoisting cable down so that it entered the drum of the hoisting engine *E* horizontally. The headframe was successful in operation.

Cerro de Pasco Coal Field in Central Peru

Probably no other outside factor has contributed so much to making the Cerro de Pasco Mining Co. a success as has the presence of workable beds of coal, some of which are of coking character. Although for the most part of rather indifferent quality, this coal has made the company independent of importations of foreign coke and of *taquia*, the dung of the llama, as fuel.

The two principal coal mines are the Goyllarisquisga and the Quishuarcancha, which lie to the north of Cerro de Pasco and are connected with the smelting works by a branch line leaving the main line at Vista Alegre between the copper mines and the smeltery. The Goyllarisquisga branch has a length of 26 mi., and from it branches a 10-mi. line to Quishuarcancha. The region is one of considerable relief with deep gorges. The grade on the railroad is steep and reaches a maximum of 5 per cent.

The coal is of late Jurassic or Cretaceous age and, associated with fireclay, occurs in a series of white- to gray-colored sandstones. The beds are not very persistent horizontally and vary greatly in thickness. The maximum thickness is 60 ft., but the average of the beds being worked is about 5 to 10 ft. Most of the coal is soft and friable and is high in sulphur and ash. Roughly, it averages one-third fixed carbon, one-third volatile matter and one-third ash. Washing cuts the ash content in half and raises the fuel value to over 12,000 B.t.u.

Extracts from a Superintendent's Diary

Again we are threatened with a typhoid epidemic, the third within five years. Each time before, we were left to our own devices in handling the situation, as all of the physicians in the county have great confidence in our camp physician and felt that we could be depended upon to handle the situation as it should be handled. But this time it happens that the infection is looming up simultaneously in so many parts of the county that two Governmental medical experts were sent for and are making a survey of the infected area.

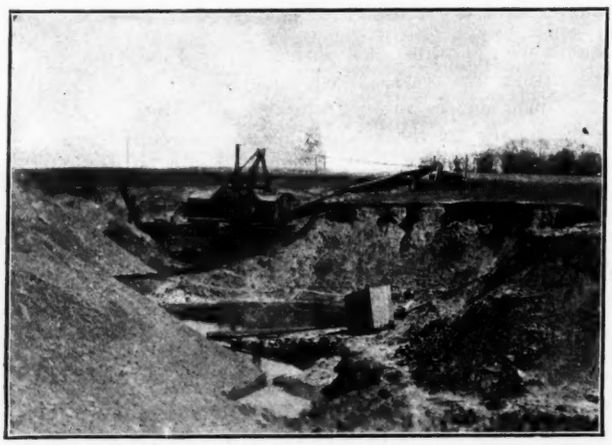
I think I realize fully the importance of rigid sanitary measures in villages where sewers are lacking, and since my own family are exposed to all epidemics that may result from any carelessness, it would seem as if our village must be a model in that respect. On the contrary, taking the word of the Government expert sent to us as final, conditions in our camp are positively shocking. I have checked up his report to see whether he might be exaggerating, and find that he is very conservative in his statements.

Our flyproof closets, that were referred to as models all over the state, are so warped and battered now, principally through carelessness, that flies come and go at will. The beautiful garbage pails with the tight-fitting lids that were donated to all housekeepers as a personal gift from the president of our company—following last year's epidemic—have almost disappeared from the face of the earth, to be replaced by barrels, boxes and what nots. That, too, in spite of the fact that a committee of ladies from our camp assured our president at that time that thereafter only sanitary garbage cans would be found in use.

My first impulse was to have our sanitary boss arrested for criminal neglect of duty, but a little further talk with the Government's expert led me to change my mind. Our commissary department has furnished all of our commissaries with the finest equipment obtainable, finest not alone in appearance but from a sanitary standpoint as well. In spite of that, and furthermore in spite of the very strict rules that govern all commissary employees, the expert reports that our commissary refrigerator is the most dangerous spot within our town borders; and some of the bins and counters were not much better. Most every day in the year I spend a few minutes, at least, in the commissary, and it is disconcerting to think that I have failed to notice that flies are everywhere, and absolute cleanliness nowhere within its walls. My wife and children depend upon that commissary for every pound of food that they receive—our sanitary boss is a bachelor.

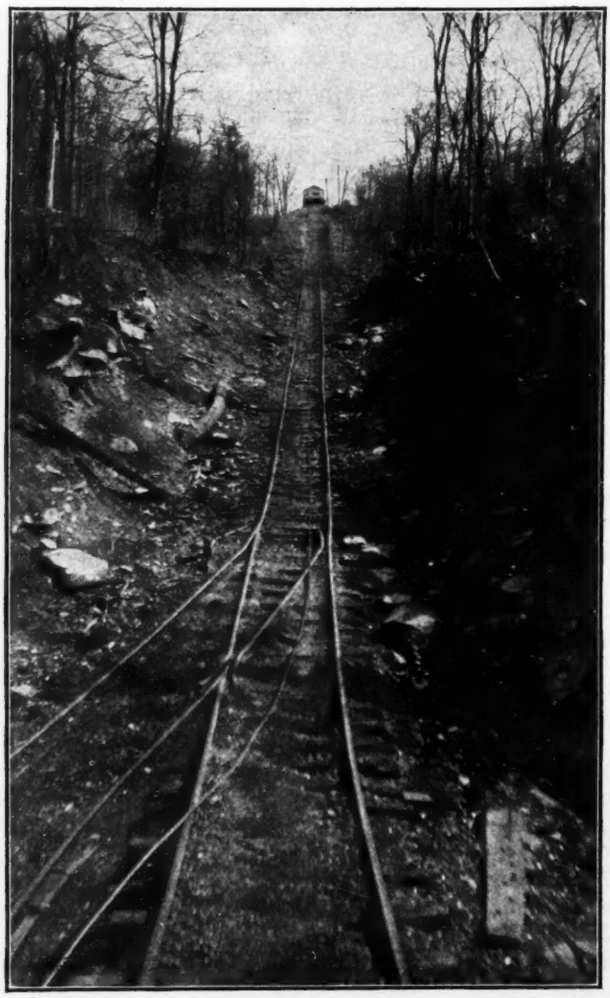
Now I have about come to the conclusion that no man can successfully supervise work for long periods of time unless he is checked up occasionally by strangers. It's well enough to talk about eternal vigilance and all of the other kinds of vigilances, but all of the rules and warnings and pleasantly worded reminders, singly or in job lots, can't change the conservatism of human nature.

Snap-Shots in Coal Mining



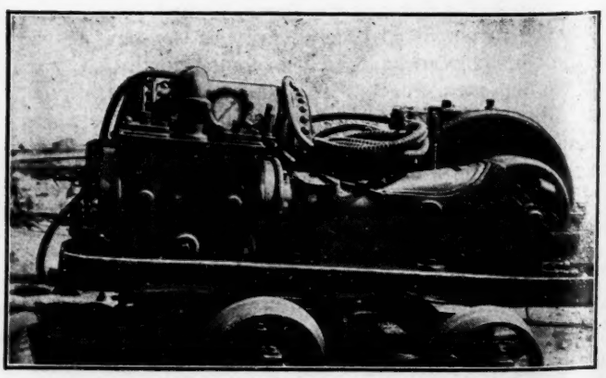
MARION SHOVEL STRIPPING COAL IN ILLINOIS

NO. 2 MINE OF REPUBLIC COAL CO., KLEIN, MONT.

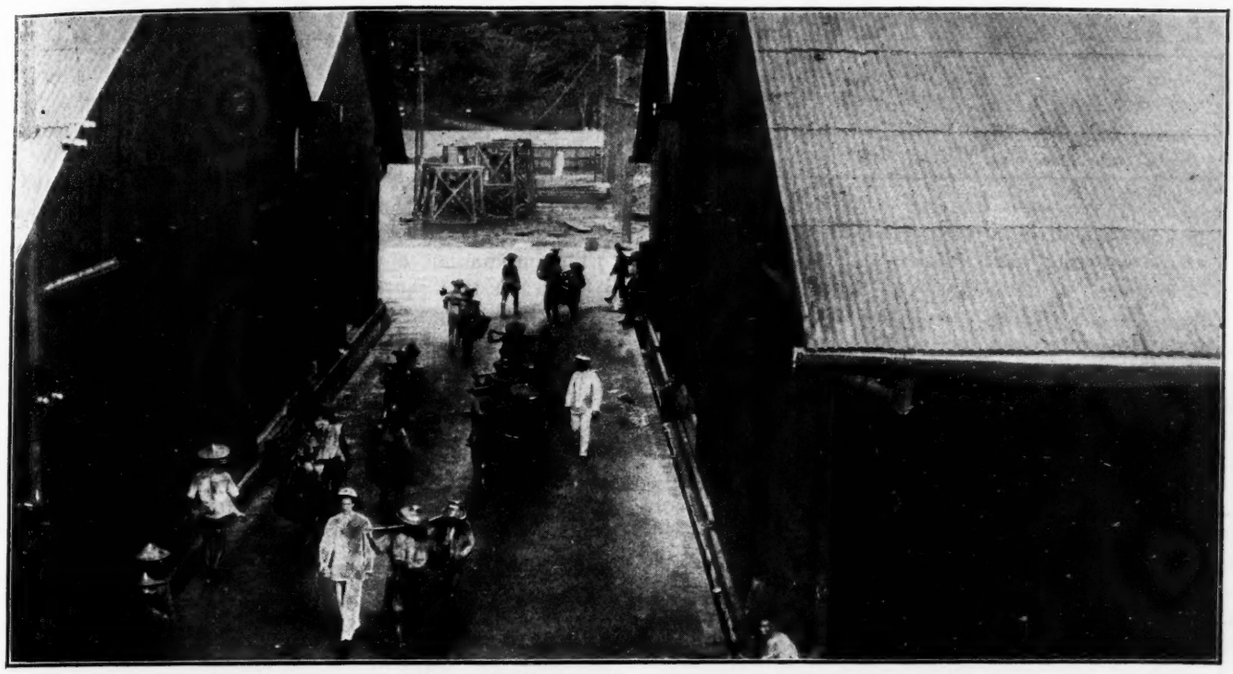


INCLINE AT VARILLA, BELL COUNTY, KY.
One of the longest inclines in the state

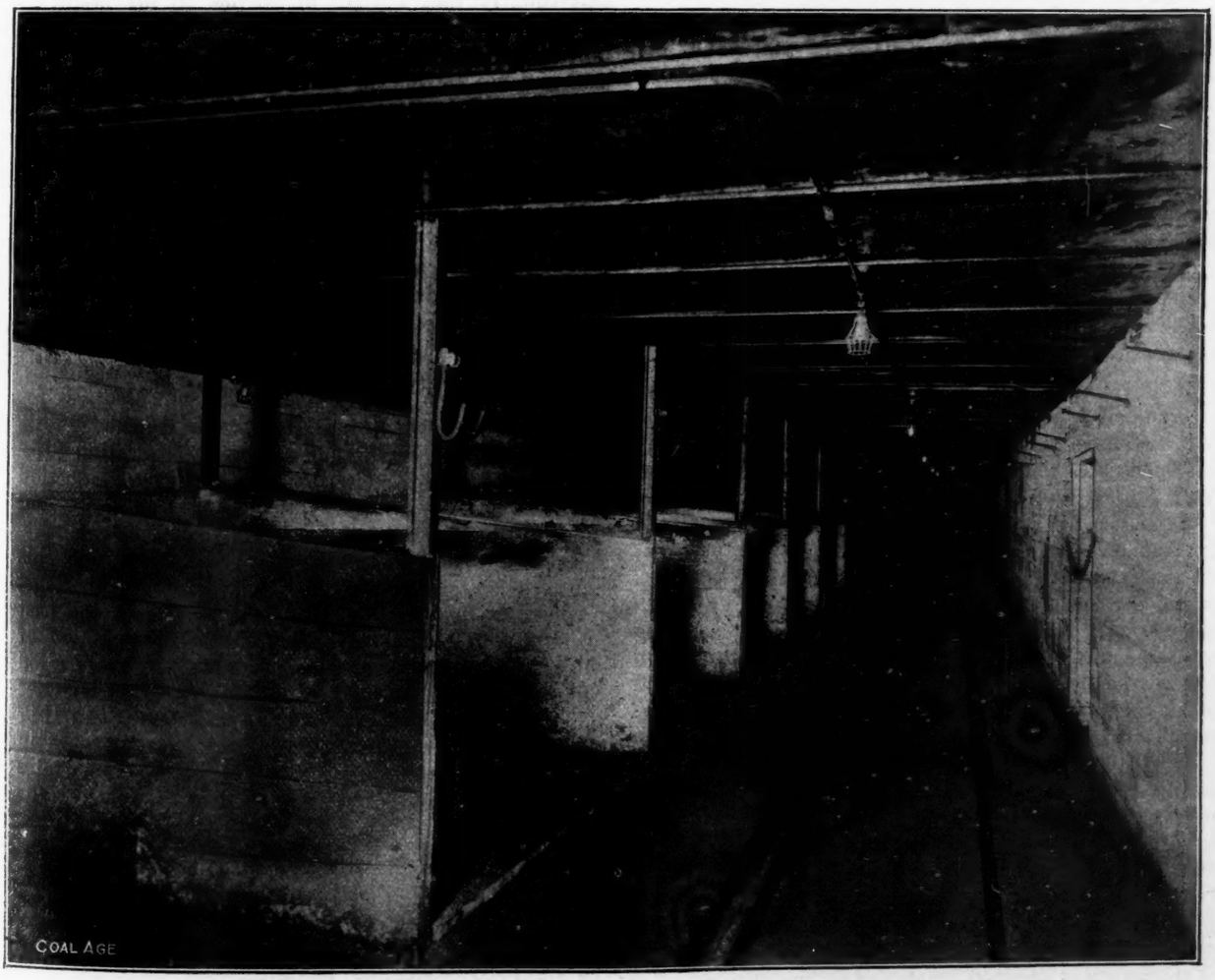
DRAG-LINE EXCAVATOR AT COAL STRIPPING IN ILLINOIS



INGERSOLL-RAND COMPRESSOR USED AT STRIPPING OF NEW ENTERPRISE COAL CO., MARION, ILL.



COOLIES COALING SHIP AT SINGAPORE, CHINA. EACH PAIR OF COOLIES CARRIES 150 LB. IN A BASKET



MULE BARN, AUCHINCLOSS MINE, D., L. & W. SHAFT NO. 1

The Byproduct Oven an Adjunct to Preparedness*

By Thomas C. Clarke†

SYNOPSIS—Description of how Germany solved the question of a nitrate supply through the aid of its byproduct coke industry and the feasibility of adopting similar methods in this country. Also an analysis of the growth of the benzol consumption. American byproduct practice generally excels the European.

In American practice the matter in which improvement has been least is the recovery of tar and ammonia. In Germany and England tar recovery is much better than with us. Theoretically our coals should yield more than 7 gal., which I showed as the recovery in the balance sheet, and ammonia more than 1 per cent. As the coking time was brought down, the yields of tar and ammonia went with it; and as the coke ovens are principally being run to supply metallurgical coke, this subject has not been given the attention that it deserves.

Benzol as a Motor Fuel

With the exception of the Semet-Solvay Co. the benzol industry is in its infancy. Plants are being built in practically every coke-oven installation since the war began, and what the result will be after the war remains to be seen. Logically its first and greatest market for benzol will be as motor fuel. The production of gasoline from crude oil is, in barrels:

	Gasoline	Crude Oil
1904	6,920,000	117,100,000
1909	12,900,000	183,200,000
1914	34,915,000	265,800,000
1915	41,600,000	267,400,000

The number of automobiles licensed shows:

1905	85,000
1910	400,000
1914	1,253,000
1915	1,750,000
1916, as of the first of the year	2,225,000

It is interesting to note that while the production of crude oil from 1914 to 1915 only advanced 2,000,000 bbl., gasoline in the same period advanced nearly 7,000,000 bbl. These figures are taken from the New York *Sun* of Apr. 17, 1916.

Assuming the production of the old-type ovens at 5 tons of coal per day of 24 hr., the larger ovens at 15 tons and getting a yield of 2½ gal. of 50 per cent. benzol per ton, we find the benzol production to be 84,990,000 gal., or 2,694,000 bbl. per year. Fear has been expressed that after the war the sudden dumping on our markets of 85,000,000 gal. of motor fuel would break the price badly and make a number of lean years for the coke-oven benzol producer.

If 200,000 of the 300,000 Ford cars produced annually remain in this country and have an average mileage of 5,000 per car and consume a gallon of gasoline for every 15 mi., the annual consumption will be 66,666,000 gal. for these cars alone. Since the benzol output, if all sold for motor spirits, only amounts to 84,990,000 gal. and one make of car uses 66,000,000 gal. with the increase in automobile production that the foregoing statistics show it seems to me we are fortunate to have a new fuel coming on the market.

The production of tar in gallons in 1905 was 36,379,000; in 1910, 69,780,000 gal., and when the various plants now built and building are in operation these figures will advance to 237,947,000 gal. of tar.

Sulphate of ammonia production in 1905 in the United States was 65,000 tons of 2,000 lb.; in 1910, 115,000 tons. When the present ovens now built and building are operating, the production will be about 340,000 tons. The price of these commodities has been 2.5c. per gal. for the tar, and for the sulphate of ammonia around $60 a ton for the past 10 years.

The Government's Proposed Nitrate Plant

I cannot leave the subject of sulphate of ammonia without referring to its connection with the proposed new nitration plant of the Government.

When in Germany last summer I became so thoroughly impressed with the necessity for preparation in this country that I yield to no one in my desire to assist toward that end, appreciating the immediate necessity of being self-contained in the matter of nitric acid and not relying on Chilean nitrates.

I was told in Germany that they were securing the nitrogen necessary for munitions by the direct electric arc process and by releasing the ammonia from the sulphate of ammonia and oxidizing it into nitric acid.

This latter process, invented some years ago by a German chemist, was not commercially successful on account of the cheapness of Chilean nitrate, but since the outbreak of the war it is one of the principal sources of supply. The abnormal conditions existing during a war justify the use of these more expensive methods of securing nitrogen, since the increased cost is negligible.

The Chamberlain bill, which I had supposed was for an increase in our army, seems to be broader in its scope, for it contains an amendment appropriating $15,000,000 for a hydro-electric plant for the production of nitrogen for the army during the war times and for fertilizer in peace times.

I believe that the Government has entered into this enterprise believing that there is a nitrogen shortage, predicating this belief on the importations in the past of sulphate of ammonia. In 1914 the consumption of sulphate of ammonia, or its equivalent, in the United States was 272,000 tons, of which the United States imported 83,000 tons; but, as previously stated, in 1917 the production will be 340,000 tons. The increase in consumption of ammonium sulphate in the United States in the last three years, from figures available, is as follows:

	Consumption, Tons	Increase, Tons
1911	230,000	16,000
1912	246,000	16,000
1913	262,000	10,000
1914	272,000	.....

This shows that the production is increasing in a greater ratio than is the consumption. Would it not

*Abstracted from an address before the New York Section of the Society of Chemical Industry, Apr. 21.

†Consulting engineer, New York.

seem reasonable, then, to suppose that the Government would foster the sulphate of ammonia industry and encourage the building of byproduct coke ovens and arrange for securing in case of war the sulphate of ammonia, benzol and toluol necessary for the making of adequate munitions for such a war and encourage the further building of byproduct coke ovens if the prospective amount of these materials was inadequate, rather than to build a hydro-electric plant?

Private capital will in the future be just as ready to build ovens as it has been in the past. Then why has the Government got to spend $15,000,000 to secure something private capital is producing now? If it feels it has to spend money, why not spend it on the sulphate of ammonia industry, where it will not only secure benzol and tuluol for itself, but where during the 99 per cent. of the time we are at peace all those working directly and indirectly in the many ramifications of the coal-tar derivatives will also be benefited?

American Practice Ahead of the European

It was my good fortune two years ago to visit most of the byproduct coke ovens in the Durham and Middlesbrough district in England and a great many of the ovens in the triangle formed by Dusseldorf, Dortmund and Wesel, which is the lower Rhine-Westphalian steel district of Germany. After having seen just before I left, the practice and mechanical refinements of the Gary plant, visiting the coke-oven operations in Europe brought back very vividly the practice here of 10 years ago. One realized how entirely we had gotten away from the old world's standard.

There were only two things that I saw where I considered they were in advance of us: One was a gas-engine installation and the other the use of mixed gases. At one of the big German steel plants they have a 10,000-hp. installation of gas engines, generating electricity, which cost them complete $300,000. That same installation over here would have cost $1,000,000, which may explain why the large gas-engine unit is less in vogue here than there.

The other instance was at Skinningrove, where Ernest Bury, who has contributed liberally to coke-oven data in a number of papers he has presented before various bodies in England, took us through his plant where he was using a mixture of three volumes of blast-furnace gas with one volume of coke-oven gas and getting a mixture about as follows: Hydrogen, 13.25; methane, 7.5; unsaturated hydrocarbons, 0.5; carbon monoxide, 22.75; carbon dioxide, 9; and nitrogen, 47 per cent., with a B.t.u. value per cubic foot of 206.

He was using this gas in his gas engine to produce electricity, also in the openhearth furnaces and in the soaking pits. These gases replaced producer gas of analysis about as follows: Hydrogen, from 9 to 14; methane, 2 to 3.5; carbon monoxide, 22.28; carbon dioxide, 3 to 6; nitrogen, 55 to 60 per cent., with a B.t.u. value of 125 to 175.

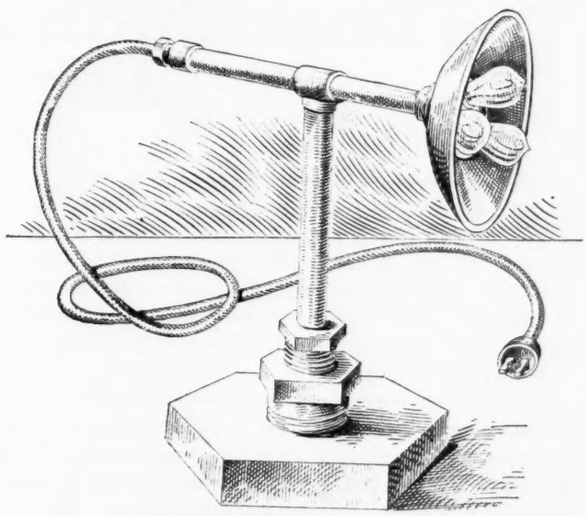
That we will come to use a mixture of this kind I am confident, especially as natural gas, which has been so instrumental in building up the steel industry in Pennsylvania, is rapidly beginning to show signs that it cannot be counted on in the future as it has been in the past.

With the exception of these two things I can truthfully say that the European practice excepting in ammonia and tar yields, is in no way comparable to the present United States practice, and in engineering and amount of production we are immeasurably superior to our instructors.

The changes that are occurring from day to day are so numerous and may be so important that one cannot help feeling that two years from now everything now said will be obsolete, excepting for the two principles involved—uniformity in the coke and regularity in the operation and in the temperatures of the ovens.

Handy Lamp Extension

A handy lamp extension can be made by tapping a piece of ½-in. conduit pipe and screwing one end into a number of reducers or using some form of weight, as shown. At the other end place a ½-in. pipe tee, using



HOME-MADE PORTABLE LAMP

also two nipples 4 in. long. On one of the nipples fasten a three-light cluster securing a metal shade at the back of it by means of a locknut. The other nipple is fitted with a brass reducing plug to which is fastened the portable cord or armored cable having a plug connection at its other end.—F. F. Sengstock in *Power*.

"Combination Shot"

The DuPont magazine for September, in an article on this subject, draws attention to the practice, which is altogether too common in coal mining, of using dynamite and black powder together in the same hole. The article states as follows:

> One or more cartridges of 40-per cent. dynamite are loaded at the point of the hole, and then a charge of blasting powder on top of this. Sometimes a blasting cap is inserted in the dynamite cartridge next to the blasting powder to insure detonation and often not. The blasting powder is ignited either by fuse or miners' squib, the explosion and heat of the blasting powder being depended upon to detonate the dynamite. The miner believes that by loading holes in this manner he is assured that the hole will break clear to the point, on account of the extra strength and extreme quickness of the dynamite.

After referring to the danger of this practice, and the enactment of mining laws in some states prohibiting it, the article condemns the use of black blasting powder in combination with dynamite in the same hole. *Coal Age* has often drawn attention to and likewise

condemned this practice, which is quite common among old-country miners, although we believe the actual facts are somewhat overstated in the article to which we have referred.

An old experienced miner may often be observed placing a small piece of a stick of dynamite, 2 or 3 in. in length, at the bottom of a drillhole before charging the hole with black powder. The miner argues that the dynamite being stronger than the powder assists the latter in its work by breaking the toe of the shot. He claims that better results are obtained by this means and ridicules the idea that the practice is dangerous. He forgets, however, that the heat of the burning powder, in some cases, may be sufficient to cause the detonation of the dynamite before the powder itself is exploded. The charge of powder is fired either by fuse or squib in the usual manner, while the detonation of the dynamite is caused by the heat of the burning powder. Should the dynamite explode a moment before the heat and pressure are sufficient for the explosion of the powder, as sometimes happens, the entire charge of black powder will be blown into the air and expend its force on the mine atmosphere, causing either a blownout or a windy shot. The writer first saw this done and forbade the practice when superintending a mine of the Eldon Coal Mining Co., at Laddsdale, Iowa. Though often effective, it is an exceedingly unsafe method of blasting and should be condemned.

The Disposition of Byproduct Oven Derivatives*

By W. H. Childs†

SYNOPSIS—The expansion of the byproduct practice in this country will hinge largely on the development of profitable markets for the derivatives. The author presents some illuminating thoughts on this phase of the problem and points out some unusual conditions we will be obliged to contend with.

We cannot, without pulling together, hope to surpass the compact organization existing in Germany. It must be remembered that Germany's great success in coal-tar dyes did not come when she was able to supply her entire home consumption, but when she was able to dominate the world's markets.

Even assuming the greatest possible success in the establishment of permanent chemical industries based on coal-tar derivatives, the importance of this from the standpoint of the tar distiller is greatly overestimated by all but those having full knowledge of the situation. The portion of tar that can be used in making synthetic dyes and chemicals is only 10 per cent. of its whole composition. I cannot overemphasize the fact that the continued growth of the tar industry and its ability to take care of the largely increased supplies that are already in sight depend entirely upon the disposal, at profitable returns, of the two principal items that constitute the great bulk of the product of tar distillation, namely pitch and creosote oil.

The total United States production of coal tar in 1915 was approximately 180,000,000 gal., of which 140,000,000 was from byproduct ovens and 40,000,000 gal. from gas works.

Until the war demands for benzol and toluol arose, their chief uses in this country were as solvents for rubber, in paints and varnishes, paint and varnish removers, grease extraction, imitation leather and as a basis for making other chemicals, as anilin, benzoic acid, saccharin, etc. With the outbreak of war a complete change has come over the benzol situation. This country found itself with a growing demand for benzol and toluol derivatives and at the same time deprived of any outside source of supply.

Toluol, the basis of trinitrotoluol, or T.N.T., now the most fashionable explosive in European war circles, jumped from 30c. per gal. to $4.50 or upward. Benzol, in moderate but increasing demand at 25c. per gal., suddenly climbed to 80c. as the basis of synthetic phenol, an essential in making picric acid, and for the manufacture of anilin oil, an important factor in the dyestuff industry.

Summary of Conditions

1. The byproduct coke-oven industry is entering upon a period of rapid development. The byproduct industries must expand to keep pace with it.

2. This expansion must take place on lines adapted to our own conditions and to the large volume of materials involved. We may learn from foreign experience, but we must not be content to copy their methods.

3. The great outlet for ammonia is in agriculture, in which direction there seems ample room for development, though it may come slowly and need fostering.

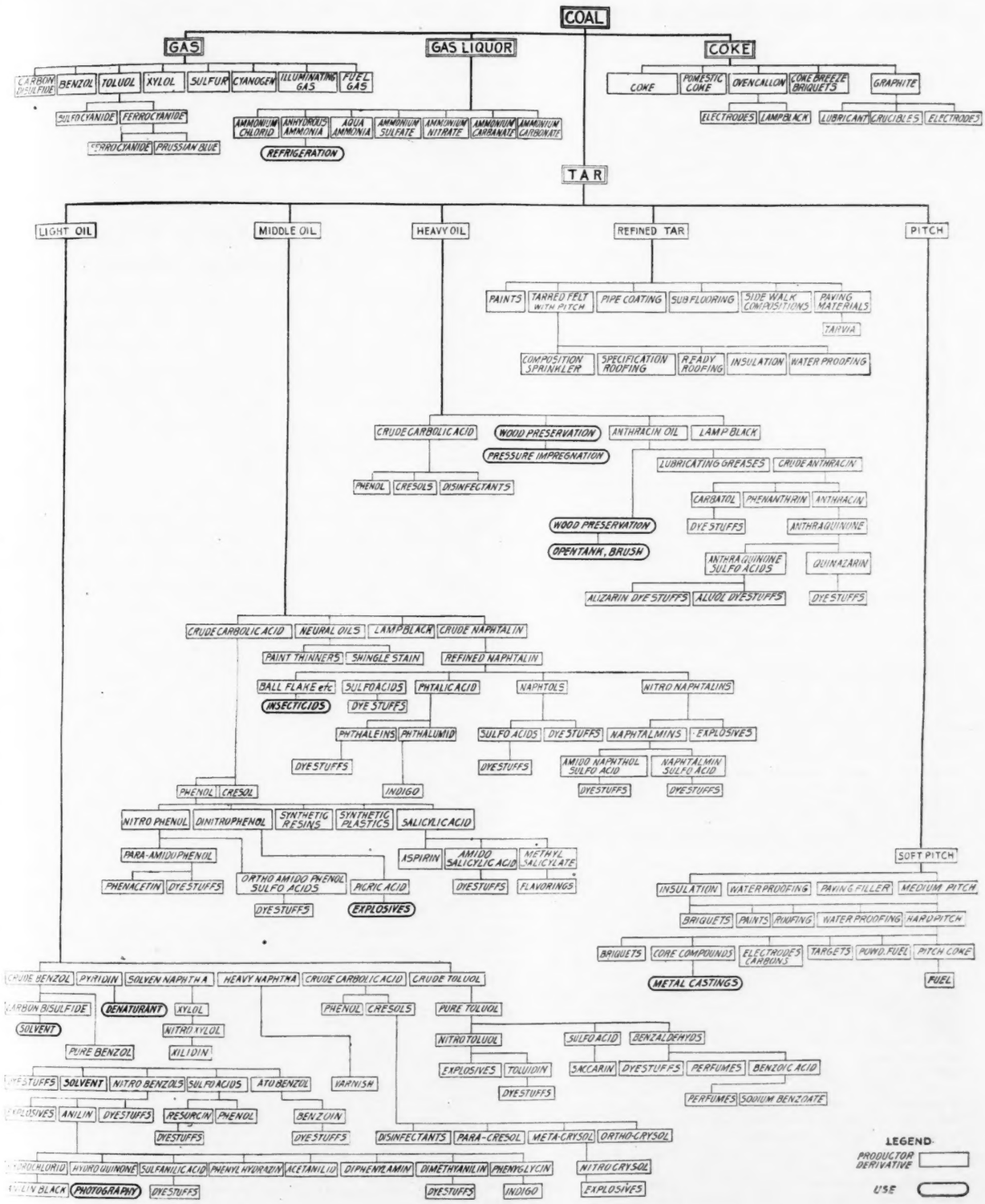
4. The future field for gas is in an increased use for general city and industrial service, made possible by more widely extended distribution systems and by replacement of natural-gas shortages, also in generating power by means of gas engines.

5. There is an ample supply of benzol, toluol and homologues now recovered for our present domestic consumption of solvents, chemical derivatives and explosives. After the present abnormal conditions are past, the surplus will find ready use as motor fuel.

6. New uses for tar must be found for an increased production of 100 per cent. within two or three years, unless it is to be used as fuel. Refined derivatives, including phenol, cresols, naphthaline and intermediates, will be produced in sufficient amount to meet the demands of the color, drug and chemical manufacturers. The degree of development in this direction depends on the action of the Government with regard to protective meas-

*Abstract of paper presented at the American Iron and Steel Institute.

†President, Barrett Manufacturing Co., New York City.



A DIAGRAMMATIC OUTLINE OF RETORT-OVEN BYPRODUCTS

tries and upon the coöperative effort of the industries involved.

The increased amount of creosote oil will tend to keep the price at such a level that European producers will seek to find outlets at home for their surplus.

7. The byproduct coke oven, besides being an integral part of our steel industries, is our main source of benzol, toluol and phenol for munitions and the wide range of chemicals of scarcely less importance. It is also our only operating native source of combined nitrogen for nitric acid, and the only possible one outside of the costly processes for fixing atmospheric nitrogen. These facts should be recognized by the Government, and coöperation for national defense should be established.

Pacific Coal-Mining Institute

Matters concerning the organization of a coal-mining institute in the state of Washington and adjacent coal fields are progressing satisfactorily. Blank-form postal cards were sent to a large number of prospective members and a high percentage of those communicated with have replied indicating their desire to become charter members of the new organization. The replies contain the names of prominent coal-mining men who are suggested as qualified to serve on an organization committee. From these names a number will be selected and asked to serve in carrying the preliminary plans to a successful conclusion.

During the past few days a number of letters have been received and here are a few extracts:

Miles Elliott Clark, Renton, Wash.—I personally feel that the organization of a coal-mining institute such as suggested would be of great benefit to the coal interests and to those most interested in them.

Martin J. Flyzik, President, District No. 10, United Mine Workers of America—Your suggestion concerning the organization of a coal-mining institute in the State of Washington meets with my hearty approval. I have wondered time and again why the mining men of the Northwest continued to cut each other's throats in the coal business and allow other fuel material to crowd them out of the local markets. I earnestly believe that if the coal men of the Northwest would organize under one head to protect their business and regulate prices, at the same time directing their efforts to combating the encroachment of oil on their business, there would be sufficient markets for all the coal mined in the Northwest. Of course, as president of the miners' organization in District No. 10, I occupy a peculiar position regarding this movement as many operators believe that a man in my work must necessarily have some ulterior motive in supporting or proposing anything that would be beneficial to the coal business. However, I desire that it be understood that no matter what our differences may be on questions affecting wages and hours of labor, we union men consider it a solemn duty to protect the coal markets against the invasion of any other fuel material. In order to have a greater uniformity in the production and the sale of coal, it is highly essential for the operators to first establish a more uniform work day, together with tonnage rates in order to determine the initial cost in the production of coal. After a uniform price is paid for labor, then it will be much easier for the coal operator to determine the price at which his product should be sold in order to derive a fair margin of profit on his investment. But reviewing the whole matter in the Northwest, I would say that the operators spend too much time seeking advantages over each other in order to be in the position to underbid one another in markets. In other words, there is a great deal more time and energy wasted crowding each other's coal off the market than there is to keep out the competitive product that is seriously injuring their business. I would urge you to carry on this campaign until such time as the coal men will recognize the necessity of organizing an intermountain association such as you propose, because the consumption of fuel oil now already equals the total production of coal in our state. Unless there is an organized effort made to check any further encroachment on coal, I am afraid that the operators will find themselves in a very deplorable condition.

J. F. Menzies, Manager, Carbon Hill Coal Co., Carbonado, Wash.—When we have our next operators' meeting, we will take the matter up and find out what the real feeling is.

Joseph Daniels, Department of Mining and Metallurgy, University of Washington, Seattle, Wash.—I believe there is a necessity for such an organization. Practically all of the coal fields are west of the Cascade range, and the men interested would find little difficulty in getting to a central point for meetings. Our local section of the A. I. M. E. at Seattle has given considerable time to discussions on coal, but we number only a few of the men actually engaged in mining. The operators and the workmen in the industry should be the mainstay of such an organization. I shall personally be glad to do all I can to help the movement. I am sure the University stands ready to lend aid in every way possible.

All of those mining men in Washington who have not as yet sent in the return postal card that was recently mailed to them from this office are particularly requested to do so at their earliest convenience. It is understood of course that there is no real obligation in the matter and no one binds himself to enter into any expenditure. It is essential that just as many names as possible be turned over to an organization committee, which temporary body will have the job of putting the movement across in a satisfactory fashion. If you have lost your card, just drop a note to the Editor of *Coal Age*, stating that you wish to become a charter member of the proposed institute.

Coal Fields of the Province of Kwangtung, China*

Kwangtung Province is dissected by three important rivers—the North, the East and the West. Their importance lies not only in their diverging positions, but in their indispensable use in conveying men and goods from the remotest parts of the province to Canton. Each of these streams cuts through coal fields at some point in its course; but to the best knowledge of the writer, the upper course of the North River cuts the largest deposits in the vicinity of Shiu Chow. The east tributary, flowing from the famous Mei-ling Pass, and the west tributary, flowing from the boundary of the Hunan and Kwangtung Provinces, join to make the North River. Shiu Chow, situated at the point of their confluence, is growing daily more important as a mining center, as nearly all the mining companies have their business headquarters there.

Within a radius of 15 mi. from Shiu Chow there are not less than 10 mines, operated by different companies. Some of these work regularly, the others intermittently; all of them lack machinery. The two larger companies, the Liang Kwang and the Hip Hing, are developing their properties on a modern system, with the view of installing machinery as soon as the properties have sufficient tonnage blocked out to warrant the expenditure. Some of the old workings date back a century, but it may be said that all of the mining done in the past has been superficial and very few of the mines have been sunk deeper than 300 ft. This may be traced to two main causes—lack of proper pumps to handle the mine water and improper ventilation.

The formation of the district strikes in a general north and south direction and dips from 30 to 90 deg. Within a strip of country 1 mi. wide by 10 mi. long it is known that 21 coal beds of varying thicknesses and qualities exist. Their thicknesses range from 1 to 20 ft. Most of the coal burns with a short purplish blue flame, without smoke or the odor of sulphur. Some of the seams produce a coal that burns with a moderately long yellow flame. The former might be classed as a semianthracite with 7 to 11 per cent. of volatile; the latter might be classed as a bituminous coal with 12 to 20 per cent. of volatile.

The Canton-Hankow Ry. runs one passenger and one freight train from each terminus daily. The run from Canton to Shiu Chow, a distance of 409 li (about 140 English miles) by rail requires some 8 hr. and entails a freight charge of $1.85 per ton. Heretofore all the coal from the Shiu Chow district came to Canton by water. The freight by boat fluctuates from $1.35 to $3.40 per ton, according to the time of the year; the trip by water

*Report prepared by a Chinese mining engineer at the request of Consul-General F. D. Cheshire, Canton, China, and published in "Commerce Reports."

requires 6 to 10 days. It has been the custom to store up the coal at the mine during the dry seasons and to ship it during spring and summer, when freight is at its lowest. Shipping by rail necessitates extra handling at the loading and unloading stations, which means additional expense, and it is a question whether much of the coal will be taken out over the railway until the company offers further inducements.

On the northwest, some hundred miles from Shiu Chow, good bituminous coal has been mined, which would command good prices in Canton; but the difficulty of navigating a portion of the west tributary of the North River makes freight rates prohibitive, and during the dry seasons the quantity transported is small. These conditions have caused the mines once working to close down. When the Canton-Hankow Ry. taps these places, doubtless the workings now suspended will prove profitable.

Within a radius of 50 mi. from Canton coal has been found in the districts of Pun-yue, Fa-yen, Tsung-shing and Ko-ming, but the seams so far prospected have not proved to be very thick, and with the high cost of mining timbers profitable mining is doubtful. Coal is also found in the Ying-tak district, but prospecting has not been extensive enough to give accurate information. With the exception of the Tu-kong region in Pun-yue, which place produces a good quality of bituminous fuel, the coal from the before-mentioned places is of the semianthracite kind.

In the extreme southwestern part of the province, in the districts of Lim Chow and Yum Chow, coal is also found. The coal of Yum Chow is quite different from that of other districts, being a good compact lignite. The deposits are fairly large, but they lie 7 or 8 mi. from the nearest waterway, which is only a small stream navigable in the dry seasons to boats carrying not over 15 tons. A distance of some 20 mi. has to be covered, when this river enters the ocean, where the coal may be transferred into seagoing vessels.

Present knowledge indicates that the future production of the larger bulk of the native coal will rest with the Shiu Chow fields. These fields have been mined over extensive areas, and coal in paying quantities has been proved. Most of the coal is semianthracite, and in a dusty condition as a rule. Its proportion of lumps is usually small. Its present consumption is confined largely to lime burning, liquor distilling and domestic uses. Although no available statistics are at hand, it may not be far wrong to say that the daily output of the entire district does not exceed 200 tons.

So far neither the local government mining bureau nor any private concern has given due attention to investigating the conditions necessary for obtaining the best calorific value from this coal (14,000 to 14,500 B.t.u.). All the power plants of factories and steamers in and about Canton have been designed to burn Japanese, Kaiping or Manchurian bituminous coal. It goes without saying that the native anthracite cannot do itself justice when burned on grates so designed. It would not be unreasonable to expect an increased market for this native coal when the use of properly designed grates and forced-draft attachments is understood or some suitable binder for briquetting the coal dust is employed, especially when wood fuel is becoming so much scarcer and more expensive day by day.

Gas Sections To Be Sealed Off

The following letter of instruction has been sent to the general managers of the anthracite district by James E. Roderick, the chief of the Department of Mines of Pennsylvania:

I beg to call your attention to the fact that lives have recently been lost by explosions of gas in anthracite mines that were supposed to be free from gas and where no gas had been reported or recorded by the fireboss.

In view of this condition, it becomes the duty of the chief of the Department of Mines to make every effort possible to prevent further disasters of this kind. To that end you are instructed, as a representative of the ——— Coal Co., with mines in the anthracite region, to give such directions as may be necessary, and see that they are carried out, to keep the mines free from accumulations of explosive gas.

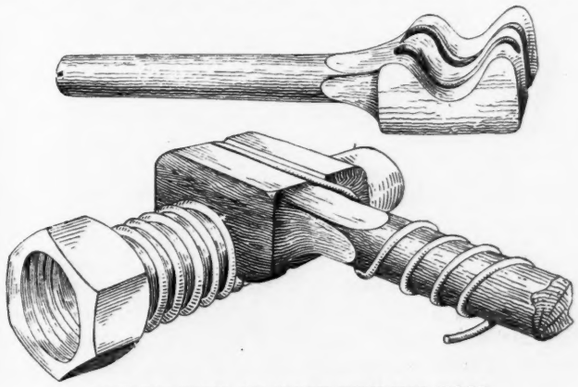
Whenever it is impossible to remove the accumulation, you will give orders, and see that they are complied with, that the affected portion of the mine be hermetically sealed so that in case of a fall or a cave-in. the gas cannot be forced into the working portions of the mine, thereby endangering the lives of the employees.

These instructions from the Department of Mines are a departure from the present practice and possibly go somewhat beyond the letter of the law, but they are justified by the conditions as stated above. However, to avoid imposing a hardship upon the operators, these instructions will not go into effect until Oct. 1.

The mine inspectors of the anthracite region have been directed by the chief inspector to see that these orders are obeyed strictly, and they have been told that if any of the company officials disregard or refuse to comply with the orders, action for their enforcement will be started by the state mining department.

Useful Hose-Binding Tool

A handy hose-binding tool can be made by taking a block of hardwood about 15 in. long and 2½ in. square and shaping it as shown in the illustration, says F. F. Sengstock in *Power*. Grooves can be cut or turned in the handle for wire ways if necessary. This handle will keep the wire taut through the process of winding. It is especially useful to steam fitters and engineers when inserting nozzles or nipples of steam apparatus in rubber hose to hold them tight.



APPLICATION OF HOSE-BINDING TOOL

The Commercial Standard of Electric Conductivity in this country is the one established by Dr. Matthiessen. It is that of a piece of supposedly pure copper wire of constant cross-section, having a specific gravity of 8.89, length 1 m., or 39.3704 in., weight 1 gram, or 15.432 grains, a resistance of 0.141729 ohm at zero degrees Centigrade, a specific resistance of 1.594 microhms per c.c., or 0.6276 microhm per cu.in. at zero degrees Centigrade. It is usual to specify that soft drawn copper shall have 98 per cent. conductivity, and hard drawn copper 97 per cent. of Matthiessen's standard.

Breathing Apparatus Suggested Six Decades Ago

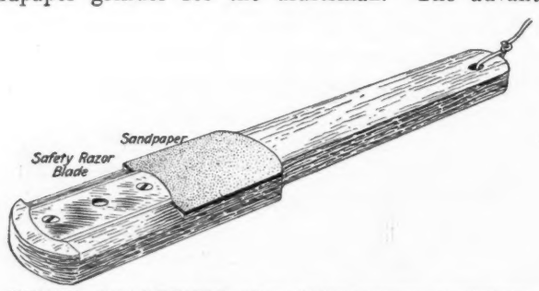
It would be an error to assume hastily that breathing appliances are purely modern products. The provision of appliances to assist in rescue operations after a colliery holocaust was recommended as long ago as 1853 by the Belgian Academy. In the same year apparatus based on the same principles as govern the modern appliances was devised by Professor Schwann, of Liege University.

An early form of the "Fleuss" apparatus was put to practical use underground in 1881 following the explosion at the Seaham colliery, in the County of Durham, and again in 1882 in connection with the Killingworth disaster. The 1880-86 Royal Commission (British) on Accidents in Mines recommended that "arrangements should be made for the establishment of centers in mining districts, where additional appliances for succor and relief and also special appliances for exploring purposes should be maintained in an efficient condition, so as to be ready for use on the shortest notice." It was also added that "it is most desirable that facilities should be afforded for the instruction of men in the use of special auxiliary appliances for exploring purposes."

Home-Made Pencil Sharpener

By G. Weber

The illustration shows a handy pencil sharpener and sandpaper grinder for the draftsman. The advantage



PENCIL SHARPENER AND SANDPAPER GRINDER

afforded by this combination is that the two things needed are combined in one.

The apparatus is easy to construct. The handle is made of wood and a razor blade is fastened to it with screws. The blade is easily removed when dull and another as easily attached.—*American Machinist.*

Tempering and Annealing

By A. H. Hervey

An engineer is often called upon to make various tools and parts of machines work which requires a knowledge of the art of tempering and annealing various common metals.

Steel is roughly divided into four classes, according to the percentage of carbon contained and its capacity for being welded: Soft steel, which is not temperable but is easily welded; medium steel, which takes a poor temper and is weldable; hard steel, which is temperable and welded with difficulty; and very hard steel, which takes a high temper and is not weldable.

A tool of hard steel that requires shaping in a machine or filing should first be thoroughly annealed. To do this, heat the steel slowly and evenly to a dark red, then cover with ashes or powdered lime to allow it to cool slowly—the slower it cools the softer it will be. A quicker way is to use the water-annealing method. To do this heat the steel as before and hold it in a pair of tongs until all color is gone or so that when rubbed with a piece of clean pine it will no longer char the stick, then immerse it in a bath of cold water. It is now ready to be machined. Annealing weakens steel slightly, but renders it better able to stand shocks.

To temper or harden tool steel, heat it slowly and evenly to a red heat for about 2 in. from the cutting edge, then immerse it in a bath of cold water or oil to a depth of 1½ in. till the point is cold. Take the tool out of the bath and polish the scale or coating from the point with a piece of emery cloth or other abrasive, then wipe the surface with a piece of oily waste. Watch the polished surface as the color comes down from the hot shank. When the edge has reached the desired color, which can be learned only by experiment and test, immerse the entire tool in cold water. As a guide it is to be understood that the darker the color the softer the edge will be. The last operation is known as drawing. The proper color is to be determined then, by the use for which the tool is intended.

Soft or medium steel that will not take a temper can have its surface hardened to a depth of about a hundredth of an inch by casehardening. This is done by heating the steel to a dark red and placing cyanide of potash on the part to be hardened. It is then put back in the fire for a few minutes so that the cyanide will be absorbed by the hot steel, after which it is plunged in cold water.

Copper and brass may be annealed by the opposite means to that used for steel—that is, by heating to a dark red and plunging into cold water or allowing it to cool in the air. If brass is heated too hot, it will fall to pieces. If properly done, brass and copper can be annealed many times without injury.—*Power.*

Some Longwall Advantages

Sir William Garforth says it has taken British mining engineers many generations to perfect the longwall method of working coal seams. As he informed the Institution of Mining Engineers, it has lent itself admirably to the introduction of coal-cutting machines, by which a rapid advance of coal face is obtained, whereby the coal is subjected for the shortest possible time to the superincumbent weight. The straight undercut induces a straight line of break, so that the roof is maintained in a more nearly solid and unbroken condition, which advantage, when assisted by the straight line of timbering, has been the means of reducing the number of accidents from falls of roof.

The straight line of face has opened the way to the coal-face conveyor, and this introduction of mechanical means has further increased the output of coal per man per day. By reason of a more regular subsidence a more uniform settlement of the overlying seams and surface land has resulted, with beneficial results. The method will assist the mine ventilation, which is quite important as the temperatures will increase as the mines get deeper.

Power at Coal Mines

[In this department will be published from time to time articles pertaining to the generation, transmission, distribution and application of power at coal mines. *Coal Age* readers are invited to contribute articles based on their own experience to appear under this caption.—Editor.]

Handling Coal in Large Boiler Houses

By H. V. Schiefer*

SYNOPSIS—Many plants more or less isolated from the mines whence their supply of fuel is derived receive their coal in railroad cars. Dumping this coal into track hoppers, crushing it to uniform size and elevating it to overhead bins by skips apparently present many advantages over other methods of coal handling.

Boiler houses of large capacity that are dependent on the railroads for their coal supply are confronted with a problem that, if not properly handled will be the cause of considerable trouble. The difficulties usually encountered are the failure to get cars at the right time and the inability to secure properly sized coal. The former difficulty is overcome by providing ample storage and the latter by operating a crushing plant in connection with the boiler house.

In the case of a large industrial plant where coal is used for various purposes, a central crushing plant is erected and the different departments are placed as near the coal supply as is possible. For example, in a large steel mill where coal is used under the boilers and also in the gas producers, the crushing and hoisting plant is placed adjacent to and between the boilers and gas producers.

In large boiler houses coal-hoisting capacities of from 50 to 250 tons per hour are encountered. For removing coal from railroad cars these requirements do not warrant the use of a car dumper, yet are too great for hand shoveling. Drop-bottom cars are therefore used in connection with track hoppers. Experience has demonstrated that a small track hopper is false economy, the proper size being about 13x33 ft. across the top. A steel grillage is usually placed over the hopper to prevent excessively large lumps, mine timbers, etc., from entering the equipment. This grillage also acts as a safety measure to keep workmen from falling in.

To insure a steady stream of coal from the bottom of the track hopper some sort of feeder is necessary. The various types employed are the reciprocating plate, plunger and traveling-apron feeders. In an equipment of this character, which is of necessity in a pit, the machinery that requires the least headroom and will do the work properly should be given preference. The traveling steel apron conveyor best fulfills these requirements and is generally used. By placing this feeder in an inclined position and feeding the coal into the crusher a short distance from the track hopper, the depth of the pit is reduced to a minimum.

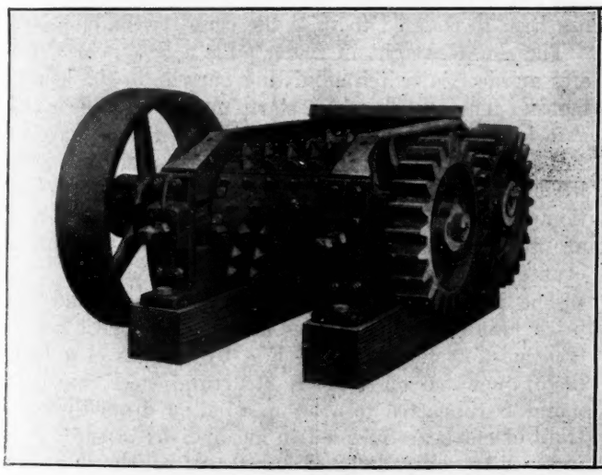


FIG. 1. THE COAL CRUSHER EMPLOYED

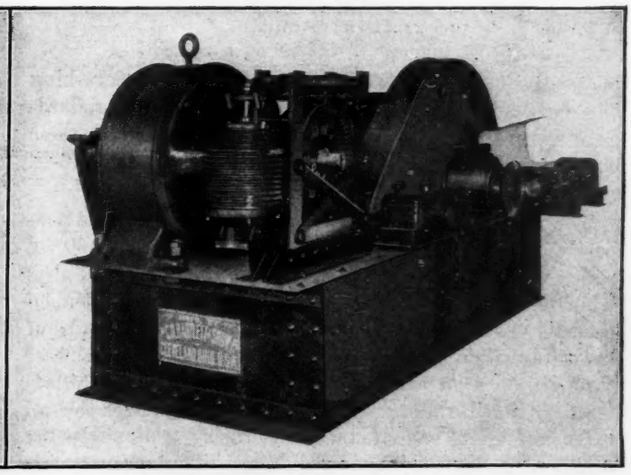


FIG. 2. THE AUTOMATIC SKIP HOIST

There are several types of coal crushers available, such as the one-, two- and four-roll machines. The most satisfactory of these in many instances is the two-roll crusher equipped with steel gears and removable steel segments on the rolls, and with capacities up to 100 tons per hour when crushing to 1¼-in. or to 200 tons per hour when crushing to 4-in. size. Such a crusher is illustrated in Fig. 1. For capacities over 200 tons per hour either a larger crusher or a four-roll machine should be employed.

Fig. 3 represents the capacities and power required for a 24x24-in. two-roll crusher when working under average conditions with a fairly soft bituminous coal.

*Cleveland, Ohio.

To elevate the crushed coal three methods are in general use—grab buckets, elevators and skip hoists. With a lift of 100 ft. or more and capacities of 50 to 250 tons per hour, the use of an elevator requires that it be extremely heavy and large; also the maintenance is high, and in the event of a broken chain the damage and delay are of considerable importance. The use of a grab bucket requires a heavy, high structure and the continuous services of a high-priced operator. The skip hoist seems to best fit into such a condition as is here presented. The use of a double counterbalanced, entirely automatic skip hoist represents the most modern method for this capacity and condition, not only showing economy but being also the last word in safety.

A typical example of such a plant as described is the boiler house of the Otis Steel Co., Cleveland, Ohio. This

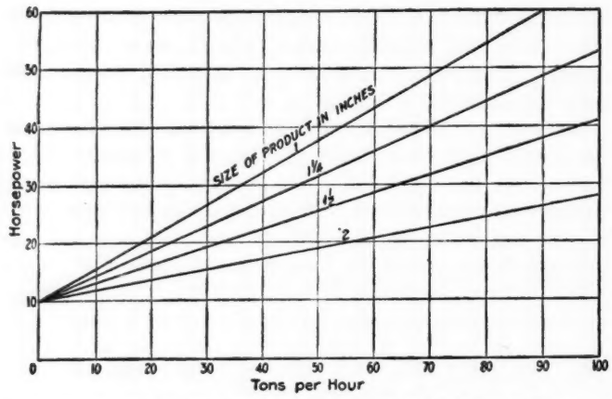


FIG. 3. CAPACITIES AND POWER REQUIRED FOR 24x24-IN. CRUSHER

plant has a capacity of 175 tons per hour for crushing and elevating. Run-of-mine coal is received in standard-gage railroad cars. When the drop bottoms of these cars are released, the coal is deposited in the 13x36-ft. track hopper.

The coal is drawn from the bottom of the track hopper by means of a steel apron conveyor or feeder 30 in. wide, which carries the coal up an incline of 30 deg. This feeder is made of a series of overlapping double-beaded ¼-in. plates mounted between two strands of heavy drop-forged chain that are joined by means of through axles on which are mounted self-oiling, chilled-tread, flanged rollers. This conveyor is driven by an extension from one of the coal-crusher roll shafts by means of a chain and gear reduction. The apron travels at the rate of 24 ft. per min. and carries coal about 21 in. deep.

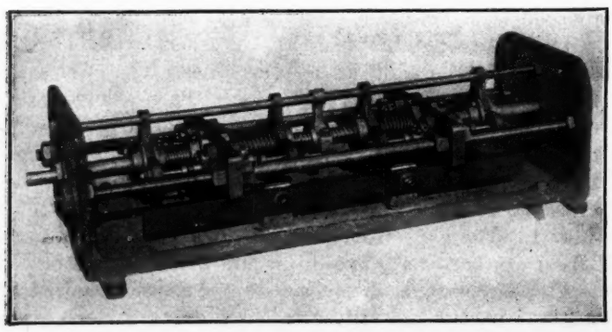


FIG. 4. THE SPECIALLY DESIGNED LIMIT SWITCH

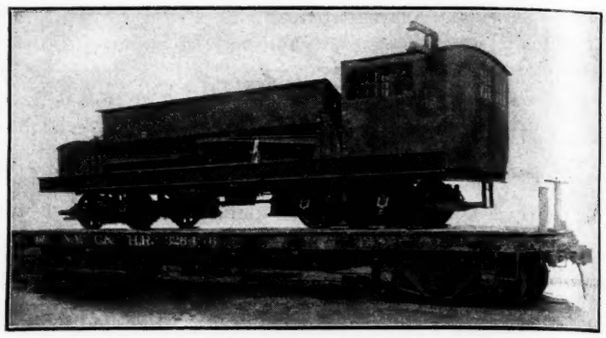


FIG. 5. COAL-DISTRIBUTING LARRY

The coal then passes into a two-roll 24x24-in. crusher, the rolls being mounted on $4\frac{7}{16}$-in. shafts which are driven by cast-steel, long-tooth gears that allow of a variation in distance between centers of rolls without getting out of mesh. One roll is backed up by a pair of heavy coil springs. The crusher rolls are driven at a speed of 161 r.p.m. by a 50-hp. General Electric motor running at 720 r.p.m. of armature shaft.

Directly under the coal crusher is placed a bifurcated steel hopper of 250-cu.ft. capacity. This hopper is provided with two gates arranged for feeding into a double automatic, patented skip hoist.

The skip hoist consists of two counterbalanced steel-plate buckets of 120-cu.ft. capacity running between parallel vertical guides. A bucket, descending, comes to rest on a counterweighted lever and at the same time pulls another lever which opens a gate in the bifurcated hopper. The coal then runs into this bucket until sufficient weight has been discharged to raise the counterweight.

The counterweight in rising pulls a lever which operates an electric switch admitting current to the hoisting motor. The bucket, which starts up slowly, allowing the gate to close, is automatically accelerated and travels at full speed until it is within about 10 ft. of the top, where it slows down and comes to a stop in the dumping position. At the same time the empty bucket goes through an opposite cycle, coming to rest at the bottom on the counterweighted lever.

The hoisting engine is placed on the ground in a brick building which houses also the automatic control. The hoist itself (shown in Fig. 2) consists of a 50-hp. motor mounted on a heavy structural steel base. The motor is connected to a 30-in. winding drum through a train of cut gears inclosed in an oil-tight cast-iron housing. A specially designed limit switch (shown in Fig. 4) is geared to the drum shaft which operates the automatic control. This limit switch and control are so accurate that the bucket stops automatically within 2 in. of the same spot whether empty or loaded.

The skip hoist lifts the coal about 115 ft. and dumps it on a screen which is placed over a bin of 500 tons' capacity, divided into four compartments. Two of these are provided for the fines to be used in the stokers under the boilers. The lumps drop into the other two bins and are used in gas producers.

The coal is drawn from this storage bin through gates in the bottom, into a traveling, motor-driven weigh larry and distributed to the various stokers and gas producers. Fig. 5 shows a larry of this character.

The ashes are removed from the boiler house also by means of a skip hoist, which discharges into railroad cars.

A motor-driven ash car carries them from the stokers to the skip hoist, which is semiautomatic in operation. The man who operates the ash larry has simply to dump its contents into the skip bucket, push a button and go on about his work. The skip hoist is so arranged that it rises, dumps and returns to its position in a manner similar to that described for the coal hoist except that it does not start automatically.

The Steam Engine's Extravagance

By C. W. Crawford*

SYNOPSIS—One hundred and fifty years of development has not produced a steam engine even approximately perfect. The poppet valve gives the best indicator card, but this type of engine is not popular. The hoist engineer is at once the prime mover of the mine and the factor of safety of the men he lowers.

Since, from almost the beginning, all material progress in mechanical, agricultural and mining lines has been contingent on the use of material produced primarily by the aid of steam power, it might be supposed that the steam engine would be the most perfect of mechanisms, that 150 yr. of development had brought out all its good qualities and eliminated its bad ones. That such is not the fact may be proved by any one who cares to consider the waste incurred through the indifferent use of steam, and the wasteful use of coal to produce it. Engines are made with a liberal clearance of 6 per cent. and upward, and few if any with as little as 2 per cent.—and clearance means waste.

It has been demonstrated that poppet-valve engines can be operated with 1 per cent. of clearance between piston and valve. Corliss engines when carefully designed show a clearance of 2 per cent. and upward. Mississippi River steamboat engines, in their time, manifested a clearance not much over 2 per cent., but these engines, having poppet valves, are out of fashion and have no rights that any one cares to respect although they are the only engines whose valves can be relied on to remain continuously steam-tight.

The Atlas four-valve engine having Corliss valves on the flat face of the cylinder heads was the nearest approach of valve to cylinder, reducing clearance to its lowest possible terms—less than 1 per cent. Yet this engine never gained any notoriety in the market except for its reputed badness. No reason could be assigned except that of leaky valves.

This unfavorable result compels the question whether any Corliss valve having its ports in a horizontal direction can be satisfactory. It will be noted its disposition is naturally to wear loose sideways, and such wear would cause it to rock away from its seat—and leak. The action of gravity at right angles to its line of wear would aggravate this tendency. Any engine having its valves on the cylinder heads must necessarily be unsatisfactory from the fact that the cylinder and valve gear are incommunicado.

Clearance beyond a reasonable per cent. means waste, and late cutoff is just as bad. Most of the common, low-class engines cut off at three-quarters stroke, and when steam is admitted at 100 lb. and exhausted at 75, what do we get for our money? And what credit do we get out of the transaction?

Wiredrawing used to be the bugbear of the old engines with throttling governors and was supposed to be a waste of power. It isn't called wiredrawing now when it is wheezed through an automatic cutoff, but the effect is nearly the same, as is exhibited by diagrams. The Corliss and some other engines show much better diagrams when new than the type of engine referred to, but the poppet valve gives the neatest, squarest and best diagram of them all. This engine, as used on Mississippi steamboats, gave what no other engine can give—a wide-open port at any point of cutoff and entire freedom from wiredrawing. As to economy, the high-pressure noncondensing nonjacketed slow-speed Mississippi River engine ran on 4 lb. of coal per horsepower per hour, probably as good economy as that of most present high-speed automatics.

The hoisting engine commonly used in the coal fields is a frightful example of popular extravagance. Besides working steam at nearly full stroke, a further waste is made by what is called the release valve, which discharges the last pound of pressure from the engines and branch pipes at the termination of each hoist. This is done for convenience in handling and is claimed to be unavoidable. Anyway, a lot of good steam is wasted, from which there is no return. Coal is cheap and therefore such little wastes do not count.

When steam is exhausted at almost initial pressure is it worth while to talk economy? When users of hoisting engines refuse to consider any improvement at additional first cost, is it worth while to offer better conditions? It is possible to use one-third stroke cutoff, in the deeper mines, and displace one boiler out of three—but there are no takers. There is little inducement to make improvements that are not wanted, and only radical ones pay the builder. Minor ones, while an advantage to the user, inure to the detriment of the builder's profit—which is meager.

The Art of Hoisting Coal

The hoisting of coal is an art little appreciated outside of that profession. An expert engineer can hoist 3,000 tons per day of eight hours. In doing this rapid duty he resorts to what is called plugging. That is, he hoists the load as fast as steam can carry it to a point near the top, at which time the cage, load and drum have acquired a momentum that would overrun the landing point. It is then he shuts off the steam suddenly and throws the reverse lever over into the reverse motion and plugs her by opening the throttle, admitting steam against the load sufficiently to check the momentum. Then the forward motion is resumed and the load is dumped over the automatic tipple.

This whole operation occupies about seven seconds, and sometimes less, in a mine 300 ft. deep. The noise of the coal passing over the screens has hardly ceased when the next car is dumped, making an almost continuous roar from morning till evening.

It requires the best that is in a man to do this work safely. Away down in his deepest profundity he must think of his work—and nothing else. The most indispensable man about a mine is the engineer, and his duty and responsibility so far transcend that of every other em-

*Brazil, Ind.

ployee that he may be considered the prime mover of the whole plant, and the factor of safety of every man who rides on his cage. He holds in his hand the power and nerve and the will to control in the matter of life and death of every man who goes below.

Among the serious hazards of the mining trade is that of overwinding. The duty of the engineer has become so onerous in recent years that it is little wonder accidents happen and mistakes sometimes occur, and since the adequate devices to prevent accidental overwinding that are absolutely reliable are few or entirely absent, such mishaps come only too frequently—and overwinding means disaster.

When the cage and its load is shot up like a rocket almost to the dumping point, with energy enough stored in it to carry it beyond, it devolves on the engineer to check its force promptly at the proper instant. A very slight error of judgment causes the accident, and it requires a powerful force applied instantly to keep within safe limits.

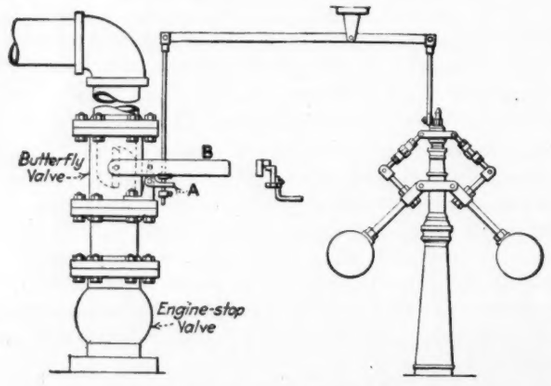
It should be understood that this operation is repeated, frequently, every seven seconds or less, but the checking and landing of the load must be done in a fraction thereof and the leeway is but a few feet. Hence, the engineer is subjected to a frightful danger more than a thousand times a day. And further it is undisputable that the stored up energy of the cage and the heavy drum must be met with an equal energy amounting to several million foot-pounds and with unvarying promptness.

To stop the fall of the cage after the rope is broken is another story.

A Home-Made Engine Stop

A home-made engine stop made entirely from material from the scrap heap—except the butterfly valve—is described in the April *Locomotive*, by J. Simpson.

The device as installed consisted of a butterfly valve placed directly above the engine throttle. The disk of the butterfly valve was arranged to be moved by a heavy lever *B* keyed to its stem in such a way that its weight was



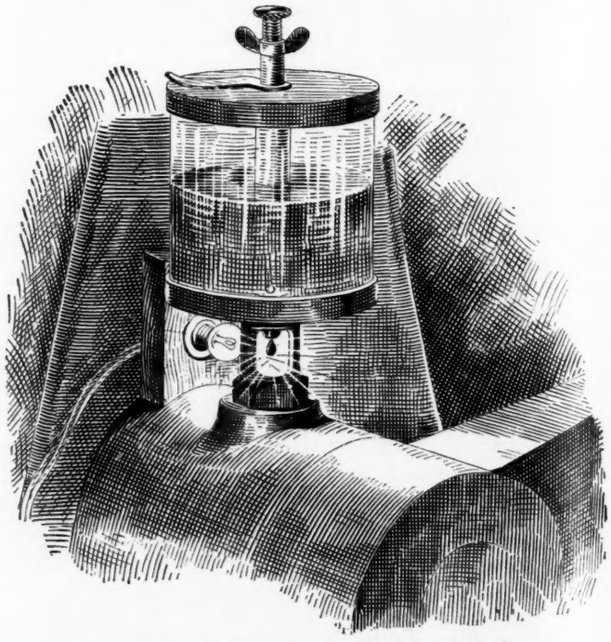
A HOME-MADE ENGINE STOP

sufficient to close the valve. The closing lever was supported in a horizontal position, which corresponded to the open position of the valve, by a projection on the side of the lever which caught on the top of a forked bell-crank lever *A*. This little lever *A* was pivoted, as shown, to a small forged bracket fastened to the valve body by one of the flange bolts. A rod was attached to the top of the governor and extended upward to connect with the horizontal lever pivoted to a point on the ceiling. The other end of the lever carried a rod which dropped down and hung between the forks of the bell-crank lever *A*. This latter rod was provided with two collars which could be set to trip the bell crank and release the valve-closing lever whenever the governor reached either the top or bottom of its travel. Thus the device would serve to either stop the engine upon the failure of the driving belt so that the governor would stop revolving and fall to the extreme bottom of its travel, or it would also act in the event of an increase in speed sufficient to send the governor to the extreme top of its range.

The arrangement proved entirely satisfactory and was retained and reinstalled when the engine was erected in a new place.

Illuminating a Sight Feed

Lubricators are frequently placed in dark places, and it is hard to see the drop of oil in the sight glass. This difficulty may be overcome by placing back of the glass a miniature electric lamp. If but one light is used, a



MINIATURE ELECTRIC LAMP AT OILER

battery is best for furnishing the current, but if several oilers are closely grouped, the lights can best be connected in series and hooked up to a regular circuit through a switch so that the current can be turned on or off at will.—T. W. Buerstatte in *Power*.

The Diameter of Electrical Conductors is usually expressed in mils, a mil being the $^1/_{1000}$ part of an inch. The circular mil is generally taken as the unit of area in considering the cross section or capacity of such conductors. This is the area of a circle the diameter of which is one mil or 0.001 in. This unit area possesses several advantages in making wiring calculations and in determining the relations between different wires having known diameters. The cross section of any solid round wire in circular mils is found by squaring the diameter of wire in mils, and, conversely, the diameter of a wire in mils is obtained by extracting the square root of the section expressed in circular mils. The constant π which expresses the ratio between the circumference and the diameter of any circle, does not enter into these calculations, thus greatly simplifying them.

The Labor Situation

General Labor Review

This week has seen one of the most important button strikes which has ever afflicted the anthracite region. It commenced last week and from indications seems quite likely to last some time. There are other strikes in the anthracite region of a local nature, none of which compares with this button strike, involving as it does 16 collieries and about 15,000 men. There are fears that it may spread even farther.

In Somerset County, Pennsylvania, the efforts of the union to extend its influence are causing much disorder and many of the mines are working with seriously depleted forces.

In West Virginia the Davis Coal and Coke Co. at Beryl granted an increase of wages to its employees. The rate is said to be the same as that paid at the Thomas mines. It will not go into effect till Sept. 1.

The strike of the miners of the Victoria mine of the Virginia-Maryland Coal Co., which has lasted since May 1, has just been brought to an end. The coal company will recognize the union, give the employees a 5 per cent. wage increase and operate with a 9-hr. day.

In southern Ohio the operators after refusing to discuss the powder issue till their men returned to work, finally granted the mine workers all they demanded while they were still on strike. The rare chance to make money after so many lean years was too good to lose, and the operators readily changed their position, which at best was of doubtful validity.

In Indiana 300 miners went on strike at the Oak Hill mine on Aug. 17, contending that they were compelled to lay tracks in the mine, whereas this work should be done by trackmen appointed by the company for that purpose.

In the same state members of the local union operating the coöperative John Bull mine at Boonville, are complaining of unfair treatment, that some miners are paid and others not. A shut-down is said to be imminent. According to the union leaders, the mine which has been in operation daily for eighteen months, is not paying the scale agreed on.

Contract Making Now Shifts to the West

In the Southwest the miners and operators can agree on nothing, but then the same condition frequently occurs. After bluffing for several weeks, one side or the other usually backs down. With the decision of the Interstate Commerce Commission permitting the reduction of rates from Springfield, Ill., to Kansas City of 65c. per ton one would expect that the Kansas miner would begin to become anxious.

In Wyoming the miners and operators have completed an agreement. The pick miners receive 2c. more per ton and the loaders 1c. In Montana the representatives of the Montana Coal Operators' Association and of the United Mine Workers of America will assemble at Great Falls on Aug. 29 and discuss separately a new wage scale and working conditions. The joint session will commence on Sept. 1. The miners are counting on the depleted market to furnish them with a lever. It is likely that the Wyoming contract will govern the action of the conference in arranging terms. The contract is likely to be for two years.

In Colorado the houses of Attilo Bevacqua and Frank Maria, coal miners employed at the Colorado Fuel and Iron Co.'s mine at Tabasco, have been dynamited, tearing away the front part of the houses, shattering windows in the neighborhood and throwing the camp into a panic. Bevacqua, his wife and four children, and Maria, his wife and three children, escaped by the rear as the front of their homes collapsed. This is the third dynamiting reported in the coal camps within thirty days.

Strikes in Anthracite Region

At the No. 1 mine of the Delaware & Hudson Co. a strike was called on Saturday, Aug. 12, to compel the abolition of the system of mining under contractors and to cause 20 employees who are not members of the union to join its ranks. The strike affects 600 men. The strikers claim that over 20 miners have each engaged several laborers to work for them and are making large wages. The other miners, they charge, are hardly making enough to live on. All the men but the pumpmen and firemen are on strike.

A strike at the Corbin colliery of the Excelsior Coal Co., at Shamokin, was settled Aug. 9, after a strike of six weeks' duration. The difference was in reference to timbering.

At the Wadesville colliery of the Philadelphia & Reading Coal and Iron Co., a strike is anticipated. The firemen think there should be more men on a shift—six instead of five as at present. As a result the firemen of three shifts, 15 in number, quit work on Aug. 10 after an ultimatum had been delivered and after the period prescribed had expired. The colliery continued to work, however, outside men replacing the striking firemen in the work of stoking.

At the Scott colliery of the Susquehanna Coal Co. near Shamokin, Penn., the breaker boys struck because the company would not pay at noon but chose 3 p.m. as the hour for payment. As a result of these boys' striking 500 men were compelled to be idle.

Coercion at Anthracite Mines

Perhaps the most concerted of recent efforts to coerce unionists into paying dues and nonunionists into joining the union took place on Aug. 17 at the mines of the Susquehanna Coal Co. and the Philadelphia & Reading Coal and Iron Co. between Shamokin and Mt. Carmel. About 13,000 men quit work. It is estimated that there are about 500 miners in the striking mines who are not affiliated with the organization.

On Aug. 18, 1,200 men of the Louis Gay colliery of the Philadelphia & Reading Coal and Iron Co. joined the strike. The miners are removing their tools, foreshadowing a long and bitter quarrel. The union leaders are trying to keep the men true to their contracts, but without avail.

W. A. B., who wrote a defense of the action of the miners in declaring a strike at the mines of the Delaware, Lackawanna & Western R.R., Coal Department, which defense was published in our issue of Aug. 12 on p. 269, replies to the remarks of "Coal Age," regarding his point of view, as follows:

Your comments and interpretation only go to show how easy it is for us without prejudice to misunderstand each other. You assume that the button strike in the southern division of the "Lackawanna" mines was directed against the nonunion men there employed. This is not altogether the fact. A more correct way of reviewing such controversies to my mind is to regard them merely as family quarrels, for it should be noted that at one of the mines thus participating in the strike there were 2,000 men employed and of these 500 only had their dues paid. When the order was posted that all the men employed at the mines were to stop work till the dues were paid, for some mysterious reason the 1,500 delinquents went on strike as well as the 500 union men in good standing. The 1,500 men must have been union men at heart or they would have gone on working and let the 500 men strike alone.

Strike to Compel Themselves to Join Union

It is true that lukewarm union men and those opposed to the union will usually come out on strike when the union calls, for it is hard to fight against a consensus of opinion and oppose ideas which have become ingrained during many years. The editor recalls a mine manager who was always condemning the union and whose stock conversation was about the malice and dishonesty of the mine committee. One day during a strike, the manager and a deputy were walking past the company houses when some one called the former a "scab." He was, when seen an hour after, still grieving over the aspersion which troubled him sorely.

Most of the men knew him by his first name, he had grown up with them and the miners seemed to have in some ways a power of suggestion over him, even though in fighting his battles with the union he seemed as hard as nails. It is a fact that men will condemn the union, refuse to pay dues and then when a strike is declared cry "Hurrah" for it.

Psychologists may have a name for this condition but even a name wouldn't explain it and W. A. B. does not try to tell us why the miners who are delinquent strike to compel themselves to pay their dues instead of paying them without using this extraordinary expedient. They remind us of the "flagellants" of the Middle Ages who flogged themselves into virtue instead of relying on the strength of their own moral disposition to make them do what was right.

"Coal Age" expects some day to see a notice of this kind: "All mines in West Virginia closed; operators are striking to compel all delinquent members of the West Virginia Coal Mining Institute to pay up their annual dues. It is expected that in a few days everyone will be reinstated into full membership and the work of the Institute will continue without intermission."

As a matter of fact it is to be suspected that the commingled fear and love of the union is not the only or most important cause of the men quitting when ordered. Many of the men want an excuse for a rest and a little recreation after steady toil. Some of them may even delay payment in the hope that their delinquency will throw the mine idle.

Those who refuse to pay union dues because they begrudge the money equally begrudge the idleness and are easily coerced into paying a tribute to the insistent majority, for such it becomes after the strike is declared.

Button Strikes Are Illegitimate

In 1903 when the Anthracite Coal Strike Commission, which had been called into being by President Roosevelt "to inquire into, consider, and pass upon the questions in controversy in connection with the strike in the anthracite regions" of the year before, handed down its awards, it declined "to make an award which would compel an agreement by the operators with the United Mine Workers of America." The commission discussed this demand at length, however, and in its report laid down certain broad principles which have been quoted in the settlement of nearly every labor dispute in this and other countries to the present time. Two significant expressions in the commission's report are as follows:

The right to remain at work where others have ceased to work, or to engage anew in work which others have abandoned, is part of the personal liberty of a citizen, that can never be surrendered, and every infringement thereof merits, and should receive the stern denouncement of the law.

The right thus to work cannot be made to depend upon the approval or disapproval of the personal character and conduct of those who claim to exercise this right. If this were otherwise, then those who remain at work might, if they were in the majority, have both the right and power to prevent others, who choose to cease to work, from so doing. This all seems too plain for argument. Commonsense and common law alike denounce the conduct of those who interfere with this fundamental right of the citizen. The assertion of the right seems trite and commonplace, but that land is blessed where the maxims of liberty are commonplace.

And the commission adjudged:

That no person shall be refused employment, or in any way discriminated against, on account of membership or nonmembership in any labor organization; and that there shall be no discrimination against, or interference with, any employee who is not a member of any labor organization by members of such organization.

Nonmembers and Delinquents on Same Footing

This award, with the other ten made by the commission, has been continued through the agreements made between the operators and their employees in 1906, 1909, 1912 and 1916. This particular award has not been modified in any way by the later agreements and supposedly stands in full force.

In the last few years, however, there has crept insidiously into the anthracite region a system by which the award of the commission in respect to discrimination has been to a considerable extent nullified. This system requires that every member of the union, in good standing, shall wear conspicuously a button indicating that his dues for the current month have been paid, and if any employee reports for work without his button or wearing one not up to date, the members of the union, in good standing, refuse to work and the colliery is thrown idle, sometimes for several days, or until the delinquent or delinquents either pay up or give up their jobs.

There is no doubt that such action on the part of the union violates the letter and spirit of the commission's award that "there shall be no discrimination against, or interference with, any employee who is not a member of any labor organization by members of such organization." The only lack of discrimination is that the same action is taken against delinquent members rather than against nonmembers.

Record of Fourteen Quite Recent "Button Strikes"

A few of the "button strikes" that have occurred within two months are:

June 8—Nine hundred men and boys quit work at the Taylor colliery of the Delaware, Lackawanna & Western Railroad Co., Coal Department, because about seventy workers reported for work without buttons.

June 17—Six hundred men and boys at the Seneca colliery of the Lehigh Valley Coal Co. went on strike in order to force the members of the Industrial Workers of the World to secure United Mine Workers of America buttons.

July 18—The Sayre and Sioux No. 3 collieries of the Lehigh Valley Coal Co. were reported idle because of "button strikes."

July 20—A "button strike" was reported at the No. 7 colliery of the Susquehanna Coal Co., by which one thousand men were thrown idle.

July 31—Nine hundred men employed at the Eagle Hill colliery of the Philadelphia & Reading Coal and Iron Co. went on strike because eight members of the union had failed to pay dues.

July 31—Twelve hundred men went on strike at the Silver Creek colliery of the Philadelphia & Reading Coal and Iron Co. because 22 men showed up at the mines without their union buttons.

July 31—Employees of the Beaver Meadow colliery of Coxe Brothers and Co. went on a "button strike."

Aug. 1—Three collieries, Nos. 2, 4 and 5, of the Delaware & Hudson Co., employing a total of 1,500 men, were idle by reason of a "button strike."

Aug. 1—North Franklin colliery of the Philadelphia & Reading Coal and Iron Co. went out on a "button strike."

Aug. 2—Eight hundred men at the Maxwell colliery of the Lehigh & Wilkes-Barre Coal Co. refused to work because a few of the employees were unable to show their buttons for the current month when they reported for work.

Aug. 3—Sixteen hundred men and boys, employees at the Coal Brook colliery of the Delaware & Hudson Co., went on strike because 34 employees reported for work without buttons.

Aug. 3—Several hundred men at the Powderly colliery of the same company went on strike because seven of their fellow workers had no buttons.

Aug. 4—Three thousand men and boys went out on "button strike" at Loomis, Bliss, Truesdale and Auchincloss collieries of the Delaware, Lackawanna & Western Railroad Co., Coal Department.

Aug. 4—Two thousand men employed at No. 5 colliery of the Susquehanna Coal Co. out on a "button strike."

Somerset County Still on Strike

In Somerset County the United Mine Workers seem to be transferring their strongest efforts from Hollsopple to Berlin and Myersdale, where they have locals. At the meeting Wednesday night of the Myersdale local, 44 recruits joined their ranks. The Pretoria mine of J. B. Kennerly, near Hollsopple, is still idle, as are the J. O. Ream and Hocking Coal Co. mines near Berlin.

Attempts were made to unionize the Stauffer-Quemahoning Coal Co. mine at Listie, near Somerset, and at two of the Consolidation Coal Co.'s mines at Myersdale, but the attempts failed.

At Hooversville the Knickerbocker Smokeless Coal Co.'s mines and those of the Baker-Whiteley Coal Co. are steadily increasing their output in spite of the union's attempts to prevent operation. The temporary injunction against the members of the United Mine Workers at this point has prevented interference with the men at work. The hearing for a permanent injunction which was continued last week was resumed at Somerset on Friday, Aug. 18, and a decision is expected to be handed down soon.

Extract From Judge Ruppel's Injunction

The judge who issued the injunction was William H. Ruppel. He enjoined "the defendants, . . . their agents, servants and employees and all other persons whomsoever from gathering at or near the premises of the complainant company, from picketing or patroling the streets, roads or ways at or near said premises and from there or elsewhere," including boarding places, "following, accompanying, annoying, ridiculing, insulting, using opprobrious epithets, intimidating, threatening or assaulting the employees of said company or members of their families . . . and from attempting by intimidation, threats, insults, opprobrious epithets and violence or persuasion to induce the said employees from their employment or to refuse or fail to perform their duties as such employees and from preventing or attempting to prevent by threats, opprobrious epithets, intimidation, force, violence, insults or ridicule, or other means calculated or intended to prevent any person or persons from entering or continuing in the employment of the said company, and from directing, aiding or abetting any person or persons to commit any of the aforesaid acts; from calling 'scab' or 'scabs' or any other opprobious epithet to persons passing along any of the streets, highways or lanes in this county, and going to and from the works of the said complainant, and who are in the

employ of the said complainant; from giving any directions or orders to committees, associates or otherwise, for the performance of any such acts or threats hereby enjoined and from any manner whatever impeding, obstructing or interfering with the regular and unrestrained operation, conduct and management of the business of the complainant, or employees now in the employ of the complainant or that may hereafter be employed by it."

Hocking Powder Rate Restored

The Hocking miners have won their strike. The powder rate is to be reduced from $1.90 to $1.65 and the companies will stand the loss as they are doing elsewhere.

A meeting of the miners and the operators was held at the offices of the Southern Ohio Coal Exchange beginning Monday, Aug. 14, and continuing for some time thereafter. The disputed powder question, which had resulted in the calling out of the men at four mines near Athens the week before, was discussed at length.

John Moore, the president of the Ohio district of the United Mine Workers of America, and Sanford Snyder, president of the subdistrict, represented the miners. The operators were represented by E. M. Poston, of the New York Coal Co.; C. G. Weitzell, president of the New York-Pittsburgh Coal Co., and Dr. T. R. Biddle, of the Poston-Consolidated Coal Co.

The operators from the first made a demand that the miners return to work and declared that without compliance with this contractual provision no negotiations would take place. John Moore ordered the miners to go back to work, but the order was not obeyed.

Struck Work Even Though Contract Forbade

The miners realized that they had the upper hand and their contract did not trouble them. But they would feel terribly wronged if a company which had the upper hand showed a knowledge of it by violating express agreements. The operators did not make their threat good. The miners continued on strike till the company conceded the reduction in the price of powder and agreed to refund at the next pay day any excess payments already made.

The operators were too anxious to take advantage of the present high market to quibble about the price of powder or about the violation of the contract involved in the strike declared against them. About 1,500 to 2,000 miners working in 9 mines were involved in the strike.

The miners of Provident mine No. 2, near St. Clairsville, Belmont County, eastern Ohio, have started a movement for the erection of a $3,000 hall. The new building will contain a meeting room and a store.

No Progress in the Southwest

The Southwest labor situation still remains unsettled. On Friday, Aug. 11, the subcommittee of miners and operators failed to agree on four of the proposed sections of the interstate agreement. The two other sections, regarding which there is contention, were to be voted on Monday, Aug. 21.

The operators have proved such clay in the hands of Howat that a break on their part always seems possible, but just lately they seem to have gained a certain unanimity of counsel, which once assured would enable them to make a contract strictly along the lines of the one in force last year, modified solely by the express provisions of the McAlpin agreement or rather of its counterpart in the Southwest.

Some of the operators' delegates have declared that the miners' officials in district No. 21, Oklahoma, and in district No. 25, Missouri, will not vote with Howat if they think a deadlock and a strike will result.

All Miners Are Not Backing President Howatt

The conservative delegates are believed to be in the majority and as the vote in joint subscale conference is a unit vote, when the matter is finally put before the joint conference it is likely to be in favor of provisions identical with those in force under the 1914-1916 contract.

The only obstacle to be met is a possibility that Howat may control the whole Kansas vote. It is said he has made all manner of promises to the Kansas locals in his campaign to injure John P. White. In order to gain his ends he may refuse to be governed by a majority vote of the miners' delegates and may insist in joint conference on dispensing with the unit vote. Then he and the Kansas delegation would vote against accepting the former working conditions. This would limit the battle to Kansas, and let Missouri and Oklahoma complete their contract by adding to the wage provision the working conditions in force during the past two years.

Wyoming Completes Its Scale

The miners and operators of Wyoming, in what the United Mine Workers term district 22, after a three-week conference at Cheyenne have agreed on a wage scale which is not so generous as the McAlpin agreement. That contract is not binding on the West, and as Wyoming is but little in competition with the East, the wage increases of that state are of small importance to the operators in the central competitive field. So no substantial injustice will be suffered by anyone.

The men receiving $3.45 per day under last year's scale will now receive $3.52 per day. The $2.50 per diem men will be paid $2.76 and blacksmiths' helpers who received $2.80 will now be entitled to $2.84. The wages of the power-house employees have been increased from $90 to $95 per month.

The increase on pick-mined coal is 2c. per ton, while 1c. per ton is added to the price paid for loading. The working conditions will remain practically unchanged. The new scale, which James Morgan, the secretary of the miners, says is the most liberal in the United States, outside of that in force in Montana, will be in effect for two years.

The scale affects some 6,000 miners. After the conference in the Labor Hall on Tuesday, Aug. 15, the miners and operators went to the Industrial Club where a smoker was held in their honor, the conferees returning home on Wednesday.

Freight Rate to Kansas City

Despite the protest of the governor of Missouri, the Interstate Commerce Commission has sanctioned a reduction in the Chicago & Alton Ry. coal freights whereby Illinois coal is to be transported to Kansas City for $1.25 per ton instead of $1.90 as formerly in force.

The operators of the state of Kansas stated that they had to pay 75c. per ton on their shipments to Kansas City territory despite the short haul involved. This freight rate and the high cost of production which the Kansas operators have to meet will prevent them from selling their screenings in the market which rightly belongs to them.

Kansas mines have been subject to frequent strikes, short car supply and irregular working time, and if the tonnage which has been theirs is now taken from them all these difficulties will be increased. The miners will quarrel with the operators over the distribution of work more than ever before, and the cars will be diverted into areas where business is more regular.

On the other hand, consumers claimed that the Kansas and Missouri operators have been unable to keep them fully supplied with steam coals under contract, and they have been forced to buy outside coals at greatly increased prices. Consumers in Kansas City and surrounding territory, seeing that the new rate means cheaper steam coals, have done everything in their power to prevent the Interstate Commerce Commision from suspending it. Action on many contracts was withheld pending a decision in the case. The territory affected by the rate consumes about 3,000,000 tons of steam coal per annum. The rate went into effect on Aug. 22.

COMING MEETINGS

American Chemical Society will hold its annual meeting Sept. 25-30 in New York City. Secretary, Charles L. Parsons, Bureau of Mines, Washington, D. C.

National Safety Council will hold its next meeting in Detroit, Mich., Oct. 17-20. Secretary, W. H. Cameron, Continental and Commercial Bank Building, Chicago, Ill.

American Electrochemical Society will hold its annual meeting Sept. 28-30 in New York City. Secretary, Prof. Joseph W. Richards, Lehigh University, South Bethlehem, Penn.

The American Mining Congress will hold its 19th annual session during the week beginning Nov. 13, 1916, at Chicago, Ill. Secretary, James F. Callbreath, Munsey Building, Washington, D. C.

National Exposition of Chemical Industries will be held at the Grand Central Palace, New York City, Sept. 25-30, 1916. Managers, Charles F. Roth and Adriaan Nagelvoort, Grand Central Palace, New York City.

New York State Coal Merchants' Association will hold its annual convention Sept. 21-24 at the United States Hotel, Saratoga Springs, N. Y. During the convention addresses will be given on the most uptodate time-saving methods for both office and yard. Secretary, L. V. Shepard, Elmira, N. Y.

Editorials

Geological Survey Speeding Up on Statistics

A welcome innovation in the policy of the United States Geological Survey is noted in the prompt publication of the railroad movement of coal, covering shipments over the 49 leading carriers for the month of July. The figures will furnish the best index to the situation in the coal business. The nearest approach to them in importance is the statement of anthracite shipments, covering approximately 90 per cent. of the hard-coal production, and the statement of shipments over the 13 leading coal roads, published by another Government department. The figures for the anthracite shipments are issued with a dispatch to be expected from a commercial organization, while the Government figures are so long in coming out as to be almost worthless for purposes of comparison with prevailing conditions.

The United States Geological Survey has established an enviable reputation for accuracy and preciseness throughout all its different branches, but in the pursuit of these points it has in the past shown a tendency to ignore the necessity for promptness in placing its vast store of statistical data before the public. We feel that the department is to be congratulated on this change of heart, and it is to be hoped that this innovation will shortly be followed by others along the same lines.

Is Unionism Worth While?

The aim of unionism as generally understood by union men is to secure for workingmen a larger percentage of the capital that labor is creating. Therefore, if unionism as a whole is accomplishing its end, it must be true that it is increasing the percentage of return obtained by laboring men out of the work they perform. Yet we rarely hear labor unionists or the socialists claim that the percentage is increasing. Rather they say it is decreasing. If this is true, the main aim of unionism has failed. Very candidly, some of the socialists declare this to be true.

Perhaps, however, it is better for the workingman that this aim of unionism should fail. For it is only the profit of capital that makes possible the growth of industry and assures cheaper production. Suppose a number of worker farmers were to insist that they be given all the wheat they produced. If then they consumed it, there would be no seed for the next year's broadcasting, and next year there would be no harvest.

Thus it would be better for those farmers if they were given only a part of the year's reaping. But then, someone will say, the farmers could set aside a part of their own seed for next year. Very good, they could; but what are *you* personally setting aside as capital? Those who do are soon called capitalists—they are men who have seed for another sowing and who hire those who have not saved seed, engaging them to do the labor of ploughing, broadcasting, reaping, threshing and bird chasing.

So the union men may be wrong when they say that unionism would be successful if it could decrease the earnings of capital, and the socialists at fault when they say it would be all right with unionism if only it could make its dreams come true. For if the dreams of unionism were all fulfilled, there would be no further human progress, for there would be no profit and no increase of capital.

The difficulty we have in recognizing what unionism has done largely arises from our misconception of the real value of money. If money were what any of us really needed, the rise of the price of common labor from 50c. per day in 1860 to $2.50 in 1916 would be an evidence of greatly increased prosperity. The workingman would be able to believe that the union had helped matters immensely, even for those men who were not laboring men.

But this increase has been accompanied by a rise in the cost of living. The advance of living cost has not been as marked, it is true, as the increase in wage. But the difference has largely arisen from the enhanced ability of capital and labor to produce goods with decreased effort. So we come back to the idea that it is not right to look at the mere rise in wage or increase in purchasing power, but at the fluctuation in the percentage of profit awarded respectively to capital and to labor.

The more labor gets, the less capital has to spend. True, it may use that capital merely in extravagance, but it may expend it in making possible some of those short-cuts to production that are feasible when you have the last word in equipment. So what passes to the capitalist is by no means all lost to the workingman. If it gets back into industry, the workman could hardly place it better if he had the ownership of it himself.

It does not all go back there, the more's the pity. Some capitalists spend as large a percentage of their profits on folly as the most prodigal workingman will spend out of his wages; but as a rule they do not, because the expenditure of a smaller proportion will provide all the needed gratification, and the man who is a capitalist has usually graduated in frugality, like John D. Rockefeller and Hetty Green.

Hence it is that unionism can do little good except perhaps in its continuous insistence on fairness between one employee and another, or by urging that assistance be given to men at their work so that their production will not be hampered, or by demanding healthful working conditions. Thus by the introduction of the 8-hr. day the union has provided that the workman will be "fit as a fiddle" for his work. In this way the union can increase the efficiency and therefore the output of capital and labor, and hence there will be more for both to divide.

But will they divide it? The history of unionism and business does not show that the union has had much influence in settling that matter. In 1868 coal sold for less than cost, the miners receiving the whole price of the coal. Today the anthracite mines are unionized, and there is now a profit of 20c. a ton on every ton mined.

It must be conceded that unions have been able to raise men in one branch of industry at the expense of those in others. No one can deny that the glass workers and tin-plate unions did this very thing. But every workingman who bought window glass or put a piece of flashing on his home paid these unions for their astuteness and labor unions usually strive for such special privileges for their own members and thus injure those in other organizations and men who have not joined any union.

Yet for the most part they have affiliated in a single labor federation as if they had aims in common. The United Mine Workers has always attended to the interests of all the mining force and so has been quite commendably altruistic. Yet inevitably it has by that action injured those in other unions by raising the price of coal. Still in many ways it is a union, more than all others, disposed to just action. It has almost never shut the door of opportunity on any worker, neither the front door nor the doors which lead into any one of its many apartments.

In Ohio the front door was closed recently by one district to all but the sons of miners, and in the anthracite region the door to the occupation of miner is closed, by a statute passed at the behest of the miners, to all who have not labored two years for a miner. But on the whole the United Mine Workers of America is in this way the cleanest kind of an organization, only it has not yet realized that it should not attempt to secure for its members more than the wage increase which is given throughout the country. Any greater advance merely lifts a burden off the miner to put it on other workers. But it is hard to make the workman see that this is true.

The union, however, has by creating disorder and idleness caused no little loss of efficiency and output and therefore has injured capital and labor. It was all done with the best of intentions probably, and there is no use in growing warm about it. The men have their rights to pursue happiness where they believe it may be found, especially as they believe it will not hurt anyone but the man who is well stocked with the good things of this world.

If they realized that the strike usually only served to lay men idle and make hard times, if they only knew that if won a strike merely burdened other poor men or crippled industry and if lost injured everyone, they would not be so keen for it except when they entered it merely to maintain their industrial status.

The operators have fed the union with bitter words and haughty conduct. The union has been persecuted, and its acts can no longer be discussed without heat. Its leaders, broad, good men as many of them are even though occasionally fanatical, have always been spoken of with unreasoning violence. But we must learn to view matters judicially, recognize the reason that animates the mine worker to try and see if his condition can be bettered by unionism. After all, he is not the first foolish fly to flutter into the flame of economic verities and burn his wings. Capital has often done and is even now doing the same thing.

So much for unionism. It seems, as thus viewed, something harmful to the human race. Next week *Coal Age* hopes to vary the wording of the question a little, writing it "Is the Union Worth While?" and thus revised it expects to answer the problem in a very difficult manner.

Western Trade Conditions

There are pronounced tendencies toward a strong market in the Western territory, with higher prices during the autumn months. Retailers and consumers have shown an apathetic attitude toward stocking coal during the summer, which has made domestic business very slow, but a turn for the better is now discernible. Steam coals will continue in unprecedented demand at maximum prices, owing to the high pressure at which the industrial plants are working. Many operators have refused to commit themselves to further contracts for steam sizes, believing that open-market prices later will give greater profits. It is believed that the comparatively high prices of screenings now prevailing, averaging nearly $1 per ton, will endure during the balance of the season, even though the domestic output is increased materially.

With the labor supply short and with inadequate car supply it looks decidedly like a seller's market this fall. Likewise the retailers are complaining of difficulty in obtaining labor to unload coal in yards. Indications are that the labor situation will be the most difficult problem for producers and retailers during the next six months.

The price situation in the West was never in better condition. From far and wide inquiries have come to the Franklin County Coal Operators Association for information as to its plans for sustaining prices. Western operators are undeniably profiting by their past mistakes and by coöperative measures eliminating the suicidal price competition of former days.

A splendid year for all-rail shipments from Eastern territory is expected. There is already a large shortage in stocks at the Upper Lake ports, and Western shippers are making preparations to increase their shipments to the Northwestern territory.

Distribution of coal will be considerably changed during the ensuing months by reason of freight-rate revisions. Among the more important of these are the entrance of central Illinois screenings into Kansas City and other Missouri and Western points, the possibility of greatly increased shipments from Kentucky and Tennessee mines to Lake ports and the advance of 5c. on rates from Indiana and Illinois mines to Indiana, Illinois, Wisconsin and Michigan points effective Sept. 1, which gives shippers of dock coal on the Lakes an advantage in certain sections.

In the Southwest, domestic and steam business is dull. Production of coal in the Southwestern States, particularly Oklahoma, has reached such a high cost that the product from other states has made serious inroads on the territory usually supplied by those mines. Oil and gas production, which has shown marked gains, has also been a factor in restricting coal consumption.

Collective bargaining has been growing apace, and we have had plenty of opportunity to view the animal and to ascertain if it is a dove of peace or vulture of unrest. The Bureau of Labor Statistics announces that there were more strikes and lockouts in the United States in the six months ended on June 1 than in the entire year of 1915. Between Dec. 1 and June 1, 1,432 labor disputes are reported, while during 1915 the number was 1,405. After the building and metal trades, mining showed the greatest strike activity. Yet mining operators were assured they were proof against strikes owing to the beneficent protection of collective bargaining.

Discussion by Readers

Coal Mining, Politics and Labor

Letter No. 1—The article of Carl Scholz, *Coal Age*, Aug. 5, p. 211, touches a subject that bears a vital relation to the industrial and political future of this country. The question of the true relation of labor and capital, though intricate and complex in the extreme, deserves a thorough discussion. Notwithstanding the fact that trained economists have devoted years of their lives to its study, the problem is still far from a satisfactory solution, and an expression of opinion from operators and workers alike will be of undoubted educational interest and practical value.

The astounding growth of the socialist political party in recent years, coupled with the newspaper space devoted to labor organizations, has engendered in the minds of many the belief that our industrial structure as a whole is rapidly undergoing a process of evolution the culmination of which will result in the elimination of both employers and capital, replacing them with a coöperative organization the details of which I have never seen satisfactorily presented, but which, as nearly as I can understand, would rob society of its most valuable asset—the incentive to individual exertion.

Legitimate Functions of a Labor Union

It can hardly be questioned, however, that labor unions are, if properly conducted, capable of rendering signal service to their members without affecting detrimentally the interests of society as a whole. The legitimate functions of a labor union may be summarized as follows: 1. It enables its members to bargain collectively when marketing their labor. 2. It facilitates the diffusion of information relative to differences of wages in different districts, thereby effecting a mobility of labor in answer to the law of supply and demand. 3. It may establish a mutual insurance plan. 4. It may establish industrial training schools for youths or unskilled laborers.

The first-named feature is, as at present practiced, the paramount function of the organization; namely, to effect a combination that will raise the wages paid its men and decrease the number of their working hours, or obtain for them other desired concessions from their employers that would not otherwise be granted them.

It will be remembered that I stipulated "wise management" as a prerequisite to the attainment of any beneficial results from the formation of a union. Speaking particularly of the miner's union, I believe its influence on the whole to have been rather more detrimental than beneficial to the interests of its members. Its strikes have too often been ill-timed and the result of hasty action or submission to unwise and self-seeking leaders, who are willing to draw salaries for noisy harangues and seemingly find their chief pleasure in the destruction and violence to which they have been able to incite their emotional followers. As I am not a coal operator this opinion, even if in error, may be accepted as coming from an entirely unprejudiced source.

It is, however, my purpose to deal with principles rather than specific instances. Mr. Scholz states in his article that "the law of demand and supply will continue to regulate" the compensation of mine officials despite the actions of labor organizations. I would ask, Does this law regulate the compensation of these officials? The answer to this question will depend, I believe, upon our definition of "the wages of management." In order to secure this definition let us divide the cost of a ton of coal into its component parts, as follows: 1. Interest on the capital invested, which is the rate of interest at which capital on the market may be induced to embark in the coal-mining business and is regulated by supply and demand. 2. Wages paid to workmen, also regulated by supply and demand. 3. Wages of management, determined by the difference of the sum of the first two factors and the selling price of the coal, and will be found to vary with the ability of the manager. If by the exercise of unusual skill he succeeds in reducing the cost of production the wages of management will have increased in that proportion. The same may be said of the converse proposition. This may or may not be the sum of the actual salaries paid to the officials, but they will usually be found to bear a definite relation to each other; and this relation, rather than any question of supply and demand, will ultimately fix the salaries of officials.

The distinction between capital as earning interest and business capacity as earning wages is, to my mind, of peculiar importance in all discussion of labor problems, because it places within the grasp of any man, regardless of his station in life, if he has the ability and perseverance to attain them, the richest prizes offered by our industrial system. The fact that a man is possessed of great wealth does not necessarily imply that he has the ability to manage economically a large business. There is a natural process, working on the order of the survival of the fittest, by which those who have some capital and unusual business ability soon acquire control of larger capital.

Growing Need of Class Legislation

This argument brings us face to face with the proposition that there is really no struggle between capital and labor, but rather between the two classes of labor—the working class and the managing class. The question Mr. Scholz raises is whether or not legislation should interfere in this struggle. To interfere in favor of either side would be class legislation, and for many decades there has been handed down from father to son the idea that class legislation is rank injustice. But the ever increasing complexity of our social fabric may justify the doubt as to whether or not this principle is longer applicable to present-day conditions.

The complete state to which division of labor has attained and the absolute interdependence of men have not sufficed to eradicate from human nature the lamentable trait that sometimes prompts one class to take an unfair advantage of the other, and this condition has

rendered more necessary a system of legislative checks and balances.

Those who are familiar with the industrial condition that obtained in the British Isles at the outbreak of the present war will hardly deny that the advantage there was with the managing class to a rather undesirable extent. From this, as well as from the other extreme, we should, if possible, protect our own country. The varying industrial capacities of men will regulate their claims to different rates of wages, other things being equal. I believe therefore that much can be accomplished toward alleviating any unrest in the mining districts by the establishment of industrial schools, not alone for the purpose of training men in their vocations, but also to develop in them the traits of economy and thrift; to teach them to strive for self-mastery; to adapt their powers to a given end; to regard the unseen good of the future at its proper value, above the visible joy of the present.

ERNEST L. BAILEY,
Crumpler, W. Va. Mining Engineer.

Handling Double-Deck Cages

Letter No. 2—I was interested in the inquiry of Gaston Libiez, *Coal Age*, July 29, p. 199, in regard to the handling of double-deck cages. It recalls to my mind the method employed at a mine where I worked for several years. A four-deck cage was used for hoisting the coal. When the cage was lowered to the bottom of the shaft it rested on what was called a "carrier." This carrier was hung in the shaft and was supported by a balance weight to which it was connected by chains that passed over pulleys at the side of the shaft. The balance weight rose and fell in a pit that had been sunk at the side of the shaft for that purpose. There was a brake operated by a lever, by means of which the descent of the carrier and the cage resting on it was controlled.

When the cage was first lowered to rest on the carrier, the cager shoved a loaded car onto the lower deck and the empty car was pushed off on the opposite side of the cage where a man was stationed to receive it. This man also operated the brake. By a slight pull on the chain attached to the brake lever, the cage was lowered so that the second deck was level with the landing. In the same manner this deck was loaded and the cage again lowered; also, the third and fourth decks were each lowered and loaded in turn. The carrier then rested on the bottom of the sump, the hoisting rope was taut and the cage ready for hoisting when the signal from the bottom was given. The balance weight was heavy enough to raise the carrier again to its original position in the shaft when the cage was hoisted.

In answer to the question, whether this scheme possessed any advantage, I would say, Yes, since it permits the cages to be loaded at the bottom of the shaft and unloaded at the top independently, and it is not necessary for the bottom men to wait on the top men unloading the other cage. Also, no time is lost in signaling the engineer to lower the cage as each deck is loaded. Only one signal is given from the bottom when all is ready for hoisting the cage. Since the rope is taut when the last deck is loaded at the bottom, there is no extra strain on the rope in starting to hoist.

McDowell, W. Va. WILLIAM NORRIS.

The Anthracite 8-Hr. Agreement

Letter No. 5—The discussion, in the columns of *Coal Age*, of the eight-hour clause in the agreement of May 5, 1916, between the anthracite operators and their employees has developed several points of interest. Not the least of these is the solution of the problem, proposed by the editor in his note appended to Letter No. 4, Aug. 12, p. 276, to the effect that "both miners and operators get together on this point." The suggestion is apt and pertinent, reminding one of Mr. Bryan's "instructions" to our (then) Ambassador to Mexico, Henry Lane Wilson, stating that "disagreements generally arise from misunderstandings, and . . . it is wise to remove misunderstandings whenever possible by conference and to reconcile conflicting interests by mutual concessions."

The suggested remedy that "an intermission of ten minutes, say at 4 p.m., be allowed and that miners who come to the shaft or slope bottom at that time be hoisted to the surface as the law requires," and that thus "giving them an hour or so in the air and sunshine above ground will better fit them for the labor of the following day" is so simple it is surprising that it has not been put in operation before this throughout the entire field. There does not appear to be any reason for objecting to it from the operators' standpoint; and, so far as the miners are concerned, the only possible objection that might be urged is that having completed their full eight-hour day, with a half-hour for lunch, at half-past three, they would have to spend another half-hour playing tag, hide-and-seek, or some other innocent game in the gangways where they might be hit by a trip of cars.

A. B. I.
Wilkes-Barre, Penn.

[If we correct the unfortunate error of a misplaced type and say 2 instead of 4 p.m. the miners could then have their games of "tag" and "hide-and-seek" in God's own sunshine. The "get-together spirit" points to the simple solution of most of our difficulties.—Editor.]

Shortage of Labor in Mining

Letter No. 1—I agree with the statement of "A Pennsylvania Foreman," *Coal Age*, Aug. 5, p. 225; namely, that the growing scarcity of labor "is a matter of much interest to mine foremen." In the anthracite region this is a serious question. I may say that if the ratio of decrease in immigration to the anthracite field continues, the industry will face a condition in which the labor supply will be exhausted before the coal beds are mined.

Previous to the European war, immigration was on the decline and has since practically stopped, as far as the anthracite coal fields are concerned. Moreover, about 40 per cent. of American-born labor have left these fields during the past two years, most of them being young men whose ages range from 18 to 35 years. It may be truthfully said that the anthracite fields have thus lost the cream of their labor.

To meet this condition, several of the larger companies have imported men from other places. Most of these men were unacquainted with mining, but were prevailed on to undertake the work by the extra inducements offered them. Only recently a large anthracite operation imported 80 men from Boston, Mass., guaranteeing them

$2.50 a day for two weeks and taking the chances of their being able to perform the work required. The company paid all transportation charges and further guaranteed the board bills of the men, besides furnishing them with needed clothing. In a week's time, only five of these men were left.

About five years ago the same scheme was tried by another company, and two men remained out of 100 brought to the mine. These results show that the average man will not work in a mine unless he has been raised as a miner. The foreigner, being a stranger in a strange land, is often compelled to work in the mines by reason of his necessity.

It is worthy of note that, the same week the 80 men came from Boston, 100 other men left the district for other parts of the state, to work in steel mills and like industries. When these industries need men, they send their agents to the coal region, generally choosing a town where a little strike or trouble exists. By means of a big ad in the newspapers, or by personal solicitation on the street, they induce good miners to leave the town, offering to pay them $1 or $1.50 a day more than they can make in the mine.

Facing the condition that labor in coal mining is becoming more scarce year by year, owing to the old miners quitting the mines for other work, many dying and others being killed in the mines, the suggestion of using foreign labor has again been presented. The employment of Mongolians is not regarded even as a remote possibility in the anthracite field. Many of this class would rather starve than work, and one good miner will accomplish more than a dozen of such fellows. The American miner will not work alongside of men whose customs and manner of life are foreign to the spirit of Americanism. It is true that these are some of the questions that puzzle the mine foreman today.

Plymouth, Penn. FRED B. HICKS.

Letter No. 2—A "Pennsylvania Foreman" suggests, *Coal Age*, Aug. 5, p. 225, that "the growing scarcity of labor" is one of the questions that puzzle mine foremen today. I want to say that where this is the case it is largely the foreman's own fault. If he is unable to get men to work for him and to keep them the reason, in most cases, is that he does not treat them with equal fairness, which the men are quick to observe.

A foreman must treat all men alike; he must see that they are able to earn a fair wage and that they are supplied with what material is needed. A good foreman will study the nature of his men individually. He will not compel a man to work continually in a bad place or place him where his experience does not fit him for the work required. He will deal personally with his men and not depend entirely on the report of an assistant foreman or fireboss, who may be prejudiced against the man; a wise foreman will investigate all complaints so as to avoid doing an injustice to a good man.

A foreman's treatment of his men is the chief factor in satisfying and holding them in the mine. I may be pardoned for giving a bit of personal experience in this connection. The mine in my charge is not an ideal working. Every heading is going to the dip and making much water. The coal varies from 2 ft. to 6 ft. in height, which means many good and many bad places that must be worked.

However, by reasonable tact and fairness I have found no trouble in satisfying my men and holding them. The work is not done, either, as company work but the men are paid by yardage and tons of coal mined. I study to place all to the best advantage. Only experienced men are allowed to work on pillars, and those who can drive headings are not given rooms. When a man finishes a bad place he is given a better one. It would be unfair to keep one in a good place and another in a bad place much or all of the time. In the low coal where rock must be taken down, due allowance is made and the work paid for accordingly.

It is important that a foreman keep his promises to his men; it is a bad practice to break a promise, as the man affected has good reason then to be dissatisfied. A foreman's word should be as good as a bond.

Speaking of equalizing good and bad work, I am now taking two men out of a dry room where the coal is 5 ft. high and putting them in a wet aircourse, where there is but 2 ft. of coal. I pay them $1 a yard for taking down 18 in. of rock. However, I have promised these men that if they drive the aircourse to a certain point I will give them each a good place.

The highest yardage paid the men is $1.75 a yard in coal varying from 3 to 5 ft. in height, measured from top of rail to roof. A foreman may find by a little investigation that the drivers favor some men who tip them with cigars, tobacco or drink, and each man does not get his regular turn of cars on this account. It is the foreman's duty to see that there is no favoritism shown the men by drivers, but that each gets his regular turn.

When in charge of a mine near Uniontown, I was able to bring the output up from 400 to 800 tons a day. When first taking charge of the mine there were 80 miners employed, and this force was increased to 150 in a single year, at a time when most of the mines in that district were unable to hold their men and keep their coke ovens charged. We had no need to advertise for men as the treatment they received was the best advertisement for the mine. JOHN BOHN.

Snow Shoe, Penn.

Certification of Mine Foremen

Letter No. 2—The reference in Letter No. 1, *Coal Age*, Aug. 12, p. 276, to the clause in the new compensation law of Pennsylvania authorizing operators to employ certified men as foremen in their mines has touched a sensitive chord.

All last summer I heard this subject discussed. It was a matter in which I was deeply interested, because I was preparing for the spring examination. The advocates of this provision of the law, I remember, were largely uncertified men, and they were so enthusiastic that I hesitated a number of times in regard to going on with my studies. I was told many times that probably there would not be any more examinations for certificates of competency. If that were true, I concluded that the best thing to do was to quit studying and get next to the superintendent.

Before doing this, however, I decided to write to Chief Roderick, at Harrisburg, and get his opinion. The reply came in a few days, stating that the usual examinations would be held, and Mr. Roderick further gave it as his opinion that, notwithstanding the provisons in the new law, few men would obtain or hold positions as mine fore-

men who did not possess a certificate of competency. That was enough for me, and I kept on studying and passed the examination successfully in the spring.

One of these "equally competent" men told me he could run a mine as well as any of them. With my knowledge of the man and of what is required of a mine foreman, I am satisfied he could neither pass an examination before the board nor make a successful mine foreman.

Another "equally competent" man, who had been assistant mine foreman for about five years, told me the other day that the inspector complimented him very highly on his work in the mine and asked him why he did not come to the examination. Encouraged by this remark I said to the man, "Suppose we brush up a little and go." He laughed, and what he said conveyed the impression that he felt himself above me.

"Certified Foreman" very properly asks, If the person so appointed . . . is fully competent and his appointment is not owing to inside influence, why should he not be able and willing to take a state examination and receive the indorsement of the state board? Certainly, if he is equally competent, he will not fail to prove his competency. The examination seldom contains anything that a competent mine foreman should not know.

On the other hand, if a foreman is appointed through inside influence, by an operator who is willing to take the chances, it is a question in my mind whether the mine inspector will not, sooner or later, challenge his competency, as the old law has not been repealed and the mine foreman's duties remain the same.

My observations lead me to believe that, as Chief Roderick says, few uncertified men will be employed as mine foremen. The penalty of an increased premium paid for accident insurance will no doubt operate and compel the employment of certified foremen. In this age of close competition, there is an ever-increasing demand for men who possess somewhat more than the average ability. In face of the growing exactions of the operating company, the men and the inspector for the insurance company, as well as the state inspector, the "equally competent" man must have some pull to gain the position he desires without a certificate. He will, no doubt, find employment at some small mine where he can fill the positions of foreman, tracklayer, timberman and driver, besides weighing and dumping the coal and other nameless jobs. My advice to young men is, Keep on studying and get your certificate, and it will not be long before the "equally competent" man will be lost to view. S. D. HAINLEY.

Allport, Penn.

Gathering-Motor Haulage

Letter No. 1—The suggestion recently made in *Coal Age*, Aug. 5, p. 227, in regard to a practical discussion of "Gathering-Motor Haulage" in mines, has interested me greatly, and I hope to read of the conditions and methods employed in different mines in this respect.

My own experience convinces me that electric-locomotive haulage in rooms, where conditions will permit, far exceeds mule haulage. One advantage is that a locomotive consumes no air and leaves no dirt. I was much interested in the instances of failure cited by Ostel Bullock, in the article to which I have referred and will describe briefly the system used in our mines, which has proved a great success.

We do not have a mule in the mine. We are operating in the regular Pittsburgh vein where the coal is 5½ ft. high. The mine is worked on the double-entry system, rooms being turned off both entries of a pair and driven to a depth of 250 ft., which makes the butt entries 500 ft. apart. The main haulage road is laid with 65-lb. steel, while 40-lb. rails are used on the butt entries and 25-lb. iron in the rooms, where the rails are 15 ft. and 30 ft. long. As the rooms advance, the shorter rails are replaced by those 30 ft. in length. In the rooms we use one splice-bar cut in two for each joint, which answers well as a return bond for the locomotive.

In order to enable the locomotive to work in entries where the rooms are turned to the right or left, it is equipped with two trolley poles, one on either side. Each locomotive is also equipped with a reel and cable, which when hooked to the trolley wire enables the locomotive to go to the face of each room. This avoids the necessity of a helper hauling the cable back and hooking it to a car standing at the face of a room, so that the motor can haul the car out of the room to the entry, as described by Mr. Bullock. In our case, as the locomotive proceeds up the room the cable unwinds from the reel on the machine. These locomotives weigh 7 tons each and haul a trip of fifteen 2-ton cars.

The empties are pushed into the mine ahead of the locomotive. At each room mouth there is a switch with latches 4 ft. long. The switch is operated by a lever 15 ft. long, to the end of which is connected an upright hand-lever 5 ft. long, which enables the brakeman to turn the switch before coming to the room. An empty car is run into a room and the trip then continues up the entry, leaving a car in the mouth of each room, till the 15 cars forming the trip are distributed in as many rooms.

Starting on the return trip at the top of the entry, the locomotive brings out a loaded car from the first room and, leaving it on the entry, proceeds to bring another load from the second room. This car is backed up and coupled to the first, and in like manner the locomotive proceeds to haul the loaded cars out of each room in turn till a full trip is made up, which is then hauled to the side track or parting ready to be hauled out of the mine.

Of course, to start this system of haulage successfully in a mine requires the coöperation of the officials, the men hauling the cars and the coal loaders. I am pleased to say that our motormen exhibit much skill in handling the situation.

It may be of interest to state that we are using both breast and shortwall machines for cutting the coal, and these machines are self-propelled by means of a cable the end of which terminates in a Y. When the machine is to be moved from one place to another, the machine helper sits on the front end and holds this cable with the Y connection up against the trolley wire, while the machine man runs the machine in the same manner as a motorman runs a locomotive. This obviates the necessity of dragging the cable through mud and stones and over rock bottom, which damages and shortens the life of the cable and reduces the expense of maintenance of the system. As previously stated, we use no mules, and there are no wooden rails in the mine. In the advance entries we use electric incandescent lights.

R. Z. VIRGIN, Superintendent,
Coal Mining Department,
Wheeling, W. Va. Wheeling Steel and Iron Co.

Inquiries of General Interest

Electric Power Transmission

Kindly answer the following questions, in regard to an electric power transmission at our mine, where we are operating a coal-cutting machine at a distance of 1 mi. from the power plant. The generator is of the direct-current type and gives a voltage of 275 volts at the switchboard. Owing to the feed wires that transmit the electric current to the mine being too small, there is a line drop of 125 volts, which reduces the pressure at the machine to 150 volts. The ammeter shows a current of 150 amp. to be passing, which is twice the amount for which the motor is designed.

The questions I would like to ask are as follows: Under the conditions named, what will be the effect on the armature of the machine and on the generator? For the same amount of cutting done by the machine, will the steam consumption be greater than what should be required for this work under improved conditions?

——, Penn. SUPERINTENDENT.

This is an example of a poorly designed electric transmission. The operation of a single machine at a distance of 1 mi. from the power plant is likely to be an expensive proposition. With a larger number of machines, it would be practicable to use alternating current for transmission and convert this into direct current at the point where the power is to be used. When using a single machine, however, in order to avoid the large line drop, which in this case is 125 volts or over 45 per cent. when it should not exceed 10 or 12 per cent. at the most, it will be necessary either to use a larger wire to conduct the current or to employ a higher voltage at the power plant. For example, with 500 volts a 000-wire will transmit a current of 75 amp. a distance of 1 mi. with a line drop of practically 10 per cent. In the present case, however, a current of 150 amp. is transmitted to the cutting machine, and this is liable to produce sparking and burn out the armature. While the generator at the power plant will not be affected by the ill conditions, the steam consumption is greatly increased, inasmuch as the power consumed is $275 \times 150 \div 746 = 55$ hp., instead of about half this amount. Installing a larger feed wire, or a second wire that will give the necessary circular mils, although not providing an ideal installation, will greatly improve the operation of the machine in this case.

Ventilation Problem

The following question was asked in a recent examination, held in this province, for first-class candidates:

A mine has three ventilating districts. In District A, the airways are 6x8 ft. in section; in District B, 8x10 ft.; and in district C, 10x10 ft. What will be the relative lengths of these airways in order to obtain an equal quantity of air in each district without the use of regulators?

Since the unit pressure is the same for all districts of the mine, I would like to ask if this question cannot be correctly answered by assuming a certain quantity of air passing in each district, and finding the required velocity of the current to produce this quantity in each of the airways mentioned and then calculating the rubbing surface in each airway by the formula:

$$s = \frac{pa}{kv^2}$$

Then since $s = lo$, and $l = s \div o$, dividing the rubbing surface found for each airway by the corresponding perimeter of the airway gives the required length.

——, Can. ALTA.

The method described by this correspondent is perfectly correct, although not the simplest means of solution. For example, applying this method and assuming that a pressure of 10 lb. per sq.ft. circulates, say 48,000 cu.ft. of air per min. in each district, since the areas of the airways are 48, 80 and 100 sq.ft., the respective velocities are as follows: District A, $48{,}000 \div 48 = 1{,}000$ ft. per min.; District B, $48{,}000 \div 80 = 600$ ft. per min.; District C, $48{,}000 \div 100 = 480$ ft. per min. Then,

$$\text{A,} \quad s = \frac{pa}{kv^2} = \frac{10 \times 48}{0.00000002 \times 1{,}000^2} = 24{,}000 \ sq.ft.$$

$$\text{B,} \quad s = \frac{10 \times 80}{0.00000002 \times 600^2} = 111{,}111 \ sq.ft.$$

$$\text{C,} \quad s = \frac{10 \times 100}{0.00000002 \times 480^2} = 217{,}014 \ sq.ft.$$

For the lengths of these airways we have:

A, $l = s/o = 24{,}000 \div 28 = 857$ *ft.*
B, $l = 111{,}111 \div 36 = 3{,}086$ *ft.*
C, $l = 217{,}014 \div 40 = 5{,}425$ *ft.*

A simple solution requiring less work is as follows:

$$p = \frac{klaq^2}{a^3}$$

Now, since the unit pressure (p), the coefficient of friction (k) and the quantity (q) are the same for each district, these factors can be ignored and l then varies as a^3/o; or, in other words, the lengths of the airways are proportional to the cube of the sectional area divided by the perimeter, which gives for each district as follows:

A, 6x8 *ft.*, $a = 48$; $o = 28$; $48^3/28 = 3{,}950$
B, 8x10 *ft.*, $a = 80$; $o = 36$; $80^3/36 = 14{,}222$
C, 10x10 *ft.*, $a = 100$; $o = 40$; $100^3/40 = 25{,}000$

To show that these two solutions give the same results, reduce each to a basis of 1,000 ft. as the length of airway in District A. This gives, in the first solution,

A, $857 \div 857 \times 1{,}000 = 1{,}000$ *ft.*
B, $3{,}086 \div 857 \times 1{,}000 = 3{,}600$ *ft.*
C, $5{,}425 \div 857 \times 1{,}000 = 6{,}330$ *ft.*

Doing the same for the second solution, we have

A, $3{,}950 \div 3{,}950 \times 1.000 = 1.000$ *ft.*
B, $14{,}222 \div 3{,}950 \times 1{,}000 = 3.600$ *ft.*
C, $25{,}000 \div 3{,}950 \times 1{,}000 = 6{,}330$ *ft.*

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—A volume of 84,615 cu.ft. of air per minute is passing into a mine under a 2-in. water gage; what is the horsepower on the air? If the volume of air was increased to 169,230 cu.ft. per min., what would be the water gage reading?

Ans.—A water gage of 2 in. corresponds to a pressure of $2 \times 5.2 = 10.4$ lb. per sq.ft. The horsepower on the air is then calculated by the formula

$$H = \frac{Qp}{33{,}000} = \frac{84{,}615 \times 10.4}{33{,}000} = 26.66\ hp.$$

The pressure per square foot, or water gage, varies as the square of the quantity of air in circulation. In other words, the water-gage ratio is equal to the square of the quantity ratio, which gives

$$\frac{w.g.}{2} = \left(\frac{169{,}230}{84{,}615}\right)^2 = 2^2 = 4$$

and $$w.g. = 2 \times 4 = 8 \text{ in.}$$

In this case the quantity of air in circulation is doubled, and, according to the rule of ventilation, four times the water gage is required to produce that result.

Ques.—To reduce the number of accidents from falls of roof, slate and coal, what precautions would you adopt and recommend?

Ans.—All haulage roads, travelingways and aircourses should be inspected regularly each day by competent men. The fireboss should give particular attention to this feature of the work. His territory should not be so large but that he can properly inspect the roof and coal in every working place in his district. When mining under a weak roof or where slips occur in the roof a systematic form of timbering should be adopted, and the mine foreman or one of his assistants should see that the timbers are set promptly as required in each working place.

Careful instruction should be given to each miner in regard to inspecting his own place and setting any timber that may be needed, before starting to load his coal. When undercutting the coal, miners should be compelled to set the necessary sprags to support the coal while the work is being done. There should be a plentiful supply of posts and cap pieces kept constantly on hand in each working place. Miners should be instructed to leave their working places promptly on the first evidence of danger and report the fact at once to the mine foreman or his assistant. Particular attention should be given to see that all loose pieces of coal or slate are taken down when first discovered.

When a place is found to be dangerous, in the early morning examination of the mine, the fireboss should fence off all entrances to that place and mark the same with a suitable danger signal, so as to prevent anyone from entering the place unwarned. On his return to the shaft or slope bottom, he should enter all observed dangers in the report book and remove from the board the checks of the men working in those places, so as to prevent their proceeding to work. Particular attention must be given to all pillar workings, and none but experienced miners should be permitted to perform such work. All violations of the mining law or mine regulations should be promptly reported to the mine foreman and the men disciplined for such acts.

Ques.—A gangway in a mine is driven due east and chambers are turned due north off the gangway. A counter-gangway is started on a course N 45° E. What must be the distance between chambers on the counter-gangway in order to maintain the same width of opening and thickness of pillar, the chambers being 24 ft. wide and the pillars between them 21 ft. thick?

Ans.—The distance between chambers, center to center, measured on the gangway, is $24 + 21 = 45$ ft. In order to maintain the same width of opening and thickness of pillar, this distance measured on the counter-gangway should be $45 \div \cos 45° = 45 \div 0.707 = 63.65$ ft.

Ques.—Two seams of coal separated by a stratum of fireclay 6 ft. thick are to be mined. What method would you adopt to avoid a squeeze in either of these seams?

Ans.—The fireclay parting, in this case, is too thick to permit of the working of these seams as one. It is assumed that the coal is anthracite of moderate hardness and the seams from 5 to 6 ft. in thickness, lying at a depth of from 100 to 200 yd. Much will depend on the nature of the strata underlying the lower seam and that overlying the upper seam, but, assuming fairly normal conditions in this and other respects, it would seem best to work the lower seam first on the room-and-pillar system.

Main and cross-entries are driven in the usual manner in the lower seam, and rooms turned off the cross-entries are driven to their limit, the width of opening and thickness of pillars being determined in accordance with the prevailing conditions of roof, floor and coal. The work of drawing back the pillars in the lower seam is now started and the fireclay parting permitted to fall as the pillars are taken out. The upper seam of coal may then be worked back from the inby end, the miners standing on the fallen fireclay. The coal falling into the lower seam is loaded and taken out through those entries. This outline will give the general plan, the details of which must be worked out to conform to the conditions existing in the seam.

Ques.—Find the tension on a haulage rope with a load of 20 tons, on an incline of 1 in 6, allowing $^1/_{70}$ for friction.

Ans.—Taking the inclination as 1 ft. of rise in 6 ft. of horizontal distance, the tangent of the grade angle is $\frac{1}{6} = 0.166$, and the grade angle is $a = 9° 28'$. The tension on the rope, due to both grade resistance and friction, is then found by the formula

$$T = W(\sin a + {}^1/_{70} \cos a)$$

Substituting the given values, $W = 20$ tons; $\sin 9° 28' = 0.1645$; $\cos 9° 28' = 0.9864$, we have

$$T = 20(0.1645 + 0.9864 \div 70) = 3.6 \text{ tons}$$

Coal and Coke News

Washington, D. C.

An industrial railways decision of importance to certain coal miners in West Virginia has been handed down by the Interstate Commerce Commission. The decision involved the question of allowances to the Kanawha, Glen Jean & Eastern Ry. and the White Oak Ry. by the Chesapeake & Ohio Railway Co. and the Virginian Railway Co. It was indicated in this decision that both industrial roads are owned indirectly by the coal operators in West Virginia, but the Commission found no objection to the leasing of these industrial roads by the trunk lines. Both roads are located in the New River coal district.

The Commission held that the Kanawha, Glen Jean & Eastern Ry. is a common carrier entitled to accept divisions of rates from its trunk line connections. It was pointed out, however, that the divisions granted by the connecting trunk lines should reflect the cost of service by the Kanawha, Glen Jean & Eastern to and from its junction points with the trunk lines.

"Nearly all of the traffic of the Glen Jean has consisted and still consists of outbound bituminous coal," said the Commission's decision. "Ten mines were served in 1911; five operated by the coal company; four by independent interests; one by Thomas Nichel, the superintendent of the Glen Jean and also of the coal company, upon lands leased from the McKells. One of the coal company's mines, Nichel's mine, and two of the independent interests' mines were also served by the Chesapeake & Ohio. The other two independent mines were on the detached branch of the White Oak Ry. to Price Hill and were served by the Glen Jean only for traffic to Pax."

The decision of the Commission further stated:

The Chesapeake & Ohio cannot upon the present record be compelled to apply its New River district rates on coal from points on the Glen Jean. It does not apply its junction point rates on coal from points on any independent coal-carrying short line with which it connects and is not shown to discriminate unjustly against operators served by the Glen Jean. The Chesapeake & Ohio appears to be quite willing to lease the Glen Jean and operate it as part of its own system.

The Glen Jean has an indirect interest in the coal company coal which it transports, for the reason that the two companies have the same controlling stockholders, the same executive and managing officers, and are conducted with little regard for the legal distinction between them.

The maintenance by the Glen Jean of a rate on coal believed by its president to be too low for the service rendered may not have been of any discriminatory advantage to the coal company as things turned out. But the commodities clause strikes at the possibility of discrimination and not merely at its actual effectuation. The dangerous tendency of the Glen Jean's action is apparent. If the road had enjoyed a heavier and more varied tonnage and had served more shippers than it did, its losses on coal might have been made up at the expense of other traffic, while the coal company would have profited to the extent that the rate maintained on coal was lower than it reasonably should have been.

If the respondents determine to arrange a lease of the Glen Jean to the trunk lines it must be filed with this Commission, together with a full statement of the arrangement. If, on the other hand, joint rate arrangements between the Chesapeake and Ohio and the Glen Jean are entered upon the respondents are directed to file for our approval a complete statement of the arrangements showing specifically the basis of constructing the joint rates and the divisions thereof. In any case such a statement must be filed within 60 days from the service hereof which shall set forth fully the joint rate arrangements between the Virginian and the Glen Jean revised to accord with the views hereinbefore expressed.

As regards the White Oak road, the decision of the Commission says:

The White Oak Railway Co. is controlled through stock ownership by the New River Co., which also controls the colliery companies that operate most of the mines served by the railway. The relationship is close, and the payment of an excessive rental by the Chesapeake & Ohio and the Virginian to the White Oak would constitute a rebate to the coal interests behind it.

The lease involved reserved an annual rental of $27,420, and obligates the lessees to maintain the property, to pay all taxes and all insurance charges on it, and to apply their New River district rates on coal from all points served by the railway. The rental reserved is equivalent to a 6 per cent. return on $457,000, whereas the reported book value of the whole road, including equipment, at the time the lease was executed was only $389,058.91. Apparently, therefore, the rental involved is excessive. No finding to this effect will be made at this time, but both the lessor and the lessees are directed to consider the matter and to report to us the results of their examination within 60 days after the service of our report herein.

Alaskan Railway Has Begun Business

Secretary of Interior Lane has just announced that the Government's Alaskan railroad is now carrying coal from the famous Matanuska coal fields to tidewater at Anchorage, a distance of 71 mi. The first coal was loaded into a train of cars on Wednesday afternoon, Aug. 16, and was taken from the Doherty mine at Moose Creek.

It was said that the importance of this event was evidently appreciated by the people in the territory, for there was a large crowd of men, women and children on the scene when the loading of the coal from the bunkers to the cars was begun. A special train, that had been chartered by the Anchorage chamber of commerce, carried an enthusiastic party of citizens from that city and vicinity. Chairman William C. Edes and Lieutenant Mears, of the Alaskan Engineering Commission, which is in charge of the construction of the railroad, were also in attendance, as was Bishop Rowe, of Alaska.

The honor of dumping the first carload of coal from the bunkers to the train was enjoyed by Miss Babe White, of Anchorage, who also has the distinction of having driven the first spike on the railroad. The incident was accompanied by the enthusiastic and vociferous cheering of the assembled multitude. No untoward incident marred the event, and there was a general expression of satisfaction that the Government's railroad has so successfully entered the coal fields at a much earlier date than had been expected.

The opening of these coal fields, the Department announced, is regarded as a most important and valuable benefit to both Alaska and the Pacific Northwest. It means cheaper fuel for that general country, and it is confidently predicted that it will be followed by new industrial and mining expansion.

Bituminous Coal Industry To Be Investigated

At the request of Representative Rainey the House of Representatives has adopted a resolution directing the Federal Trade Commission to embrace the bituminous coal industry in its investigation. The resolution, as adopted, reads:

Whereas it is alleged that unfair methods of competition are widely practiced in the bituminous coal-mining industry of the United States; and

Whereas it is alleged that in consequence thereof the industry in many districts has been demoralized financially, and numerous operating companies have been forced into receiverships; and

Whereas it is also alleged that in consequence thereof some 200,000,000 tons of coal are permanently lost to the Nation each year in unwise and improvident methods of mining; and

Whereas it is further alleged that in consequence thereof some 500,000 employees at the mines are kept idle from one-fourth to one-third of the working time, with much ensuing hardship and loss to themselves and those dependent upon them; and

Whereas such conditions, if existing in the bituminous coal industry vitally touch the interests and welfare of the public as a whole; therefore be it

Resolved, that the Federal Trade Commission be, and is hereby, directed to begin and make inquiry immediately into the conditions in the production and distribution of bituminous coal and to report the facts to Congress with recommendations.

Representative Madden was at first prone to object to the passage of the resolution. In his remarks to the House Mr. Madden said:

If the Federal Trade Commission is to be authorized to investigate the difficulties that surround the coal industry, there is no reason why it should not be permitted or requested to investigate all the other industries. It does not seem to me that the coal industry ought to be specially selected for this kind of an investigation.

Mr. Rainey explained, however, that already the Senate has passed a resolution calling upon the Trade Commission to investigate the anthracite coal industry of the United States He added:

It finds that the two industries, the bituminous coal industry and the anthracite coal industry, overlap and merge in such a way that an investigation of both industries can be conducted at the same time and with the same amount of difficulty and expense as the investigation of only one of them. This investigation has been requested both by the operators and by the men who labor in the mines, and has been requested by the following organizations among others: The Chamber of Commerce of the United States, the American Federation of Labor, the United Mine Workers of the World, the American Mining Congress, Pennsylvania and Ohio coal operators, Central West Virginia Coal Operators' Association, Split and Gas Coal, Association of West Virginia, Southern Appalachian Coal Operators' Association, Indiana Coal Trade Bureau, Franklin County Coal Operators' Association (Illinois), Southwestern Coal Operators' Association, the Chicago Coal Merchants' Association, Williamson County Coal Operators' Association (Illinois), and the Central Illinois Coal Bureau.

HARRISBURG, PENN.

Employers who elect to come under the state Workmen's Compensation act, to prevent them from being sued in civil action for injury to employees, cannot put up as a defense that the employee has been injured through his reckless indifference to danger.

Such a defense, however, would be a legitimate one if the compensation law had been rejected by the employer, so that in the event of an injury to the employee, the latter would be privileged to bring civil action for damages. In such a case, however, the common law defenses are removed, and the defense of reckless indifference would have to be proved as a fact in itself.

This is the opinion given by counsel for the compensation board in an accident described as being due to the employee's recklessness. The man was working in a certain place and should have used a pair of steps, but instead, he began to climb up the elevator shaft. He got half way up when the elevator came down, severely injuring him.

In another opinion rendered by the counsel, it is made plain that compensation due to an injured employee for disability or to his family for his death, cannot be altered by any other circumstances through which the employee may receive payment for disability. This opinion was of special interest to a large corporation, whose employees are organized under a mutual benefit association. The payments of this benefit fund, under the control of the employer, aggregate more than the payments under the compensation act, and the question was asked if such payments could be made in lieu of compensation payments.

The counsel for the board says that whatever payment may be made by any organization to an employee during disability or to his heirs on his death could not be made an offset against the amount due under the compensation law. The state required the payment of the compensation, as per schedule regardless of whether payments are made by employers, benefit associations, lodges, or private insurance carriers.

Certain Claims Are "Postponed"

Chairman Harry A. Mackey, of the state Workmen's Compensation Board, made public an opinion on Aug. 19, in which it is ordered that the 26 appeals filed with the board involving questions of interstate commerce be placed on the "postponed calender" and that all appeals hereafter filed involving such questions be delayed until the supreme court of the United States shall have passed upon the conflict of jurisdiction between federal and state tribunals.

The conflict arises, Chairman Mackey says, in his opinion, from the fact that congress by the act of 1908 legislated as to the methods of litigation when both the employer and the injured employee were engaged in interstate commerce. The act of congress applies solely, however, to employees of railroads. This legislation was enacted before any state created a compensation law. Since then 32 legislatures have provided methods of compensation for injured workmen.

In his opinion, Chairman Mackey, argues that while congress has the right to usurp the power of a state compensation board because of its right of regulation of interstate commerce, that it should not do so.

Chairman Mackey shows by cases cited that every form of railroad activity has been included as part of interstate commerce in more than 500 decisions on the federal employers liability act. Such being the case, Mr. Mackey argues no railroad man can come under a state workmen's compensation law if congress persists in occupying the field. This leads to the conclusion that congress ought not to usurp the field, and ought to repeal its present act of 1908. Mr. Mackey states that in his opinion the Sutherland bill now pending in congress would not bring the relief desired in cases involving interstate questions, and he makes the observation that the welfare of the vast army of railroad workers will be more promptly and thoroughly secured by allowing them to submit their claims to state tribunals than by any scheme that can be devised by congress.

PENNSYLVANIA

Anthracite

Lansford—Bath houses are being erected at the No. 11 colliery dam by the Lehigh Coal and Navigation Co. for the use of employees.

Hazleton—"Old Sugarloaf," the pioneer mining district in the Hazleton coal fields, established long before the city was planned, is to be put out of existence. The site will be razed to recover coal underneath. The town lies within the limits of Hazleton.

Colliery operations are becoming more difficult daily in this vicinity because of the scarcity of men. This is an unusual condition for August, when the demand for labor is ordinarily at its lowest ebb. Judged by present conditions the outlook for winter is far from promising; as a matter of fact a number of colliery officials do not hesitate to say that the situtaion is serious even now.

Mahanoy City—Morea colliery employees recently made a record production of coal for one day without a colliery boss to direct them. Even the superintendent was absent, and the work, both inside and outside, moved without accident and less friction than on any day in the history of the colliery.

Wilkes-Barre—Practically all the mines in the anthracite region were suspended on Aug. 15, owing to the observance of a holiday. At a number of collieries a start was made, but these were later closed owing to the lack of men.

Parsons—Once again the flag denoting efficiency supremacy will float over the Mineral Springs colliery of the Lehigh Valley Coal Co. The Sayre colliery tied with Mineral Springs this year, but owing to the fact that the average of the latter colliery for last year was in excess of that of the Sayre for the same period, the flag was awarded to Mineral Springs. Third position resulted in a tie between several mines. In connection with the fire drill and condition of fire-fighting equipment, the Oneida colliery scored perfect, having 25 points in that division of the work, being tied with the Henry colliery for first place. The Deringer colliery was second with 24.5 points.

Mocanaqua—That a more friendly feeling exists between mine workers and the state constabulary than has been the case in the past was evidenced in a recent meeting of Local No. 1,157, United Mine Workers of America. Trouble was anticipated from outsiders on account of reinstating a former member, and threats had been made. The secretary of the union sent a letter to the state police asking for protection. In response, a private was sent with a detail and perfect order was maintained. About 150 attended the meeting which was probably the first instance wherein a feeling of harmony and coöperation prevailed between this labor organization and the police.

Bituminous

Johnstown—It is said that new labor elements are appearing in this field every day. It is believed that these will influence the labor situation long after the European war has been brought to a close. It is said that large numbers of negroes from the extreme South are being imported, approximately 6,000 having arrived from Florida alone. These, however, have been scattered over several counties. Mexicans are arriving almost daily, bringing their families with them. They are said to make fairly good laborers.

Pittsburgh—The property of the Clifton Coal Co., of Brooke County, W. Va., consisting of 300 acres of coal land, and an operating mine together with a number of houses, have been sold recently to C. Ferguson, of McDonald, Penn., for $400,000. This deal has been in progress for some months, but was only consummated recently. It is understood that a company has been formed to operate the mine on an extensive scale.

Connellsville—The Connellsville coke production recently exceeded 400,000 tons per week, but the shipment of 200,000 tons of coal to new byproduct coke ovens in other parts of the country indicates that the trend of the industry is changing. Eighty thousand tons will be shipped weekly to Youngstown alone, this amount replacing former shipments of 64,000 tons of coke. The coke car supply was abundant, but there was a shortage of coal cars during the week in question.

Butler—It is reported that a 3-ft. bed of cannel coal has been discovered in a hill west of Butler, just outside the city limits. Bituminous coal has been mined for more than 50 years along the valley, but no indications of cannel coal had been discovered. A local street car conductor recently found what he considered was a showing of cannel coal in the hills near Lyndora. He and an associate explored the hill and made an opening, and were rewarded recently, it is said, by striking a 3-ft. bed of cannel coal of good quality. The commercial value of this deposit, however, will depend upon its extent.

Uniontown—Work on the construction of a side track to the mine of the Smock Coal Co., one-half mile east of Smock, was recently started by the Pennsylvania R.R.

WEST VIRGINIA

Charleston—The Governor of West Virginia has issued an appeal for financial aid for the distressed people in the flood district on Cabin, Paint and Coal creeks, following a personal inspection of the damage done on a two-day tour of the flood section on foot. An area about 15 mi. square was devastated, it is estimated, and many of the miners have left for other districts on account of the damage done to the mines. Martial law prevails, with members of the West Virginia National Guard on duty.

It is stated by officers of the Cabin Creek Consolidated Coal Co., that the losses incurred by that firm in the recent flood will amount to at least one-half million dollars. The company has already ordered a large amount of new material for the construction of houses, which will be of good quality and conveniently arranged, and will be erected as rapidly as possible. All regular employees are at work, and more are desired.

Forty-one men employed in the mines of West Virginia lost their lives during July. McDowell County led the list with 11 fatalities, while Fayette County had 8. Other counties had from one to three fatalities each, as follows: Logan, Mercer, Mingo, and Raleigh, three each; Marshall and Marion, two each; Braxton, Harrison, Preston, and Tucker, one each. Falls of roof and coal caused 22 deaths; mine cars, 6 deaths; motors, 3 deaths; coming in contact with electric wires or uninsulated parts of machinery, 5 deaths, and local gas explosions, 2 deaths.

Williamson—It is stated that the Crystal Block Coal and Coke Co. with mines at Rawl and Gates, recently received a large increase in orders, which will furnish its mines with work every day for a considerable period. Men now employed by this firm are making good wages, and more men are desired.

Davy—The Davy-Pocahontas Coal Co. has been placed in the hands of a receiver. It is believed that the property will be sold.

MARYLAND

Frostburg—A barn, the property of the Consolidation Coal Co., near the Hoffman Mine was recently destroyed by fire together with about 100 tons of baled straw which was stored there. The loss is estimated at $2,500. The cause of this fire is unknown, this being the fifth company barn to burn in the last five years.

ALABAMA

Birmingham—The American Coal Corporation, with headquarters in Birmingham, and coal mines in Jefferson and Walker counties, has filed a voluntary petition in bankruptcy, with assets estimated at $1,032,000 and liabilities of approximately $483,000. A receiver has been named and it is announced that operations will not be attempted under the receivership.

KENTUCKY

Whitesburg—Machinery and equipment for the power plant of the Southeast Coal Co., at Laviers, Ky., purchased from the defunct Wolf Valley Coal Co., at Wolf Coal, has arrived and is being installed.

Kona (Mater post office)—An incline and a tipple, to be equipped with rope-and-button retarding conveyor, have been contracted for by the Elkhorn Coal Co. This equipment will have a capacity of 1,000 tons daily.

Pineville—District headquarters of the United Mine Workers, embracing a number of mining plants in Kentucky, Tennessee and Alabama, are to be removed from Knoxville, Tenn., to Pineville, Ky.

H. M. Wilson, who is at the head of the mine inspection work of the ten associated companies carrying workmen's compensation insurance in Kentucky, after an inspection of the mines of the White Star Coal Co., near Wilhoit, and of the Federal Coal Co., on Straight Creek, expressed gratification over the conditions he found. He stated that he believed the conditions of these mines warranted expectation of a reduction of at least $1 in the premium rate if they are at all representative of others in the state. If means for improving on the safety conditions are carried out, it is said to be likely that the rate will be reduced by one-fourth.

OHIO

Bellaire—Several mines in this vicinity were recently made idle because of a shortage of cars. Many of these mines have in the recent past worked little more than half time.

Teegarden—The West Pittsburgh mines which have been closed down entirely for some time on account of the condition of the boilers which needed repairs, recently resumed operations with prospects for a long and steady run.

Glouster—It is reported that the Sugar Creek mines of the Continental Coal Co., some of which have been closed ever since January, 1908, will be reopened, employing several hundred men. Mines 210 and 211 will be placed in operation by Sept. 1, it is stated. Improving market conditions are responsible for the move.

Columbus—The Southern Ohio Coal Exchange has branched out in its activities and in addition to collecting and distributing statistics on the cost and selling price of coal it is planned to open a credit bureau. This bureau will be under the charge of Walter D. McKinney, commissioner. Its purpose is to collect and distribute information along the line of the credit of purchasers. Another activity is that of conservation, safety and workmen's compensation. A special committee consisting of E. M. Poston of the New York Coal Co.; C. G. Weitzell, president of the New Pittsburgh Coal Co., and Henry Gilbert, of the Black Diamond Coal Co., was named to have charge of this branch of the work. The rate under the state compensation law is gradually increasing and this works a hardship on the operators, as it increases the cost of production. Many flagrant abuses of the compensation law have been discovered. It will be the duty of the committee to investigate and expose these deceptions.

ILLINOIS

Murphysboro—Officials of the Big Muddy Coal and Iron Co. announce that shaft No. 10, which has been idle for several months, is ready to resume operation. It is one of the largest mines in the southern Illinois coal field.

Taylorville—The new Peabody mine, which has been closed down for months, is to be reopened. It will take two or three weeks to clean up the mine. The plan is to electrify it throughout. More men will be employed than heretofore and the output will be considerably greater. It is understood that R. E. McLean, who has been superintendent of the old mine, will be transferred to the new one in the same capacity.

Belleville—Thomas Wright, St. Clair County mine inspector, has just completed his anual report for the fiscal year ending June 30. It shows that in the past year five miners were killed in the county, four from Belleville and one from Lenzburg. Forty-one miners were injured. During the year 3,286,251 tons of coal were hoisted, of which 2,895,464 tons was shipped and 85,995 tons was supplied to locomotives. The average number of days worked was 146. By machine 2,222,142 tons were mined and by hand 1,064,109 tons. The powder used amounted to 58,049 kegs. Two mines were abandoned during the year, the Diamond Joe at Millstadt and Mine No. 3 of the Southern Coal, Coke and Mining Co.

The Vulcan mine, south of here, was practically destroyed when it caved in as a result of 48 hours' rain. John Rauth had just left the mine when the shaft caved and the tipple collapsed. The mine had been sold a few days before by the administrators of the Gundlach estate to E. M. Irwin, representing the Belleville Bank and Trust Co., for $10,300. It is probable that another shaft will be sunk for the purpose of salvage.

WYOMING

Kemmerer—A carload of miners arrived here recently from Colorado and were put to work for the Kemmerer Coal Co. Others are expected later. This company is putting on extra men, it is said, on account of unusual demands for coal by the Oregon Short Line and other railroads. It is reported that orders were recently received for 40,000 tons. This coal is being stored along the Oregon Short Line in anticipation of big business in the future.

Sublet—For several months the work of excavating a new slope in the No. 5 mine has been in progress. This has proven a large task, but the slope has just been completed and a new 1,400 ft. tunnel now leads to the mine. Electrical machinery will shortly be installed, and when this work is completed the mine will be in position to take out more coal in a day than formerly, and also at a saving in power.

FOREIGN NEWS

London, Eng.—The Official announcement has been issued that at a recent conference in Pallanaza, Italy, between British and Italian ministers a complete understanding was reached on all points discussed relating to the coal supply of Italy and that country was assured a supply of coal which is indispensable for war purposes.

PERSONALS

J. B. Kennerly recently let a contract for the construction of 30 miners' houses at his recently acquired Pretoria Mine near Hollsopple, Penn.

E. E. Loomis is reported as having resigned his position as vice-president of the Delaware, Lackawanna & Western Railroad Co. to accept the presidency of the Lehigh Valley Railroad Co. The rumor has not yet been verified.

Thomas R. Jones, division superintendent of the Mahanoy and Shamokin Division of the Lehigh Valley Coal Co., has resigned that position to enter upon duties with the Madeira-Hill Coal Mining Co., as general superintendent.

Harvey Thompson, bookkeeper for the Lee J. Sandridge Coal Co. recently underwent a successful operation for appendicits. Although his case was a severe one where a few hours delay would have resulted seriously, he is reported as being convalescent and expecting to return home soon.

OBITUARY

Louis G. Addison, a director in the New York Coal Co. and a well-known corporation attorney of Columbus, Ohio, died suddenly of heart disease at his home recently.

J. A. Grantham, assistant foreman in the mines of the Empire Coal and Coke Co., was recently injured in a mine wreck at Landgraff, W. Va., dying a few hours afterward in the Miners' Hospital at Welch, W. Va. Mr. Grantham was a native of Pulaski County, Va., and had had 26 years mining experience in the Pocahontas field. He was 60 years of age at the time of his death.

INDUSTRIAL NEWS

Pittsburgh, Penn.—The Kent Coal Co. recently purchased 64 acres of coal in Young Township in Indiana County, Pennsylvania. The price paid for this land was $8,000.

Washington, D. C.—A Civil Service examination for the position of junior computer in the Bureau of Mines at Pittsburgh, will be held at various points Sept. 20 and 21.

Fairmont, W. Va.—Judgment for $30,980.01 was recently granted by Judge Vincent against the Black Fork Coal Co., the First National Bank of Fairmont being plaintiff in this suit.

Charleston, W. Va.—Coal shipments over the Norfolk & Western and Virginian railroads to markets outside of the state amounted in May to more than 2,500,000 tons. The Norfolk & Western handled 2,225,152 tons, and the Virginian 436,199 tons.

Ebensburg, Penn.—A coal tract of 1,749 acres, 1,622 acres being in Indiana County and 127 acres in Cambria County, was recently transferred to the Vinton Land Co., the landholding subsidiary of the Vinton Colliery Co., of Vintondale. The consideration was $249,494.82.

Charleroi, Penn.—Pittsburgh and Philadelphia capitalists recently purchased 500 acres of coal in Marshall County, W. Va., through William McNair of Pittsburgh, and will start immediate developments. Two hundred dollars per acre was the price paid, the total being $100,000.

Parowan, Utah—A discovery of coal is reported as having been made in Iron County in the Iron Spring Range, 22 mi. east of Lund, and 15 mi. west of Parowan. Three seams of coal of good quality have been followed for 4,000 ft. along the strike and have also been cut by a tunnel.

Uniontown, Penn.—Twenty-eight tracts of coal land belonging to J. V. Thompson will be offered at sheriff's sale on Aug. 26, 28 and Sept. 2. These are situated in Morgan, Jefferson and Cumberland Townships, of Greene County, and range in area from 1½ to 150 acres each.

Bluefield, W. Va.—It is believed that if August coal shipments continue throughout the month as heavy as they have been thus far, a new record will be established. The average delivery for the month has been far above normal, running close to 2,200 loads delivered east and west each day.

Connellsville, Penn.—The Northern Connellsville Coke Co., owned principally by Uniontown men, was purchased on Aug. 17, by a number of Connellsville men. This plant, Marthabel, is located near Greensburg and is now running. All of the 40 ovens are expected to be in blast in a short time. F. E. Markell, has been elected president of the new company.

Wellsburg, W. Va.—The contract let by the La Belle Iron Works to the H. Koppers Co. calls for completion of the new byproduct coke plant just north of Follansbee, by Oct. 1. Many workmen have been employed in this work since erection was started early last fall, and more have been added in the recent past so as to complete the job in contract time if possible.

Philadelphia, Penn.—Just as retail dealers find it necessary to urge consumers to buy their winter coal early, so the Link-Belt Co., finds it necessary to emphasize the need of dealers placing orders early for wagon loaders. Even with its enormous producing capacity, and liberal stock of the 17 different types of loaders produced, the Link-Belt Co. foresees that many dealers who defer ordering until the last moment will be disappointed.

St. Louis, Mo.—River men say that if there is a general railroad strike there will be a revival of commerce on the Mississippi River. They believe a local coal famine could be averted by pressing into service towboats and barges, and bringing coal from the mines on the Illinois and Ohio rivers. There are about a dozen idle boats on the Mississippi and about the same number on the Ohio which, it is pointed out, could be used as towboats.

Pittsburgh, Penn.—Under the order of the Federal Court, the Wabash-Pittsburgh Terminal Ry. was sold under the hammer recently, for $3,000,000. The sale took place on the steps of the Wabash Terminal, and the purchasers, representing the reorganization committee of creditors, were Russell F. Thomas and Lester Solomon. Among the subsidiary companies, is the Pittsburgh-Wabash Railroad and Coal Co., valued at $10,000,000 and owning 12,000 acres of Pittsburgh coal.

Bluefield, W. Va.—It is said that construction will begin immediately on the second detached line of the Baltimore & Ohio R.R. system in Kentucky. This is the Long Fork R.R. to be built from the forks of Beaver Creek on the Chesapeake & Ohio Ry. south to Weeksbury, Ky., a distance of 26 mi. Contract for this work has been awarded to the Bates & Rogers Construction Co. of Chicago. A mining town is being developed at Weeksbury in connection with the operations of the Elkhorn Gas Coal Mining Co. which is constructing an extensive plant there for the production of coal.

Charleston, W. Va.—Miners' dwellings are being erected rapidly in the recently flooded Cabin Creek district, some being rebuilt from old houses wrecked by the flood. It is expected that by the time the mines are in readiness for operation sufficient housing will have been secured. Mud and sand in partly destroyed houses along the creek has prevented many dwellings from floating away. The railroads are being furnished all labor obtainable, and the tracks are being rapidly constructed along all the stricken valleys so that no delay will be encountered in shipping coal as soon as it can be produced.

St. Louis, Mo.—The Peabody Coal Co. filed an inventory petition recently in the United States Circuit Court under the interlocutory decree in relation to the St. Louis & San Francisco Railroad Co., in opposition to the confirmation of the recent sale of the road. The coal company contends that it has a claim against the railroad company aggregating $103,407.54, of which $82.660 is subordinate to the general refunding mortgage. The prayer of the Peabody company is that the final decree may be so modified as to provide that the unsecured creditors of the railroad company shall be paid the full amount of their claims either in cash or its equivalent in prior lien bonds of the new company.

Charleston, W. Va.—The damage done by floods along Armstrong Creek was much greater than at first reported. Powellton, Kimberly, Columbia, and other towns were in the path of this flood and many houses were destroyed. The plant of the Powellton Coal Co. was damaged to the extent of $50,000. The company's store, club house, the post office and another store were carried away, while merchandise stocks valued at $5,000 were ruined. The M. B. Coal Co. lost 11 houses at Columbia, as well as a cement powder magazine containing more than 100 kegs of powder. The county road along the creek was completely wrecked and will have to be reconstructed before traffic can be resumed.

St. Louis, Mo.—The Inner Group Coal Trade Bureau has sent a communication to Secretary of War Baker urging that the proposed nitrate plant for which Congress has appropriated $2,000 000 be located at or near East St. Louis. The advantages suggested are the central location and the proximity and cheapness of coal and water power. The fact emphasized is that electricity can be produced more cheaply with coal than with water power. The Secretary is reminded that coal of excellent steaming quality can be purchased under long-time contract in unlimited quantity in the inner group at $1.10 to $1.40, delivered at the plant. The declaration is made that the East St. Louis district enjoys the cheapest coal in the world and the freight rate is so low as to amount practically to only a switching charge.

Market Department

General Review

Anthracite trade active in all departments and prices firm. Bituminous consumers crowding operators for shipments and some coals entirely out of the market. Short supplies at upper Lake ports. Shortage of steam sizes in Middle West becomes more pronounced.

Anthracite—The prospective cessation of transportation facilities, supplemented by the approaching end of the discount period, have stiffened up the market in an impressive manner. The early predictions of an active business are being more than fulfilled. Production is more or less restricted by the inadequate car supply and slow movement, and the output is being readily absorbed. Indications are that shipments for the current month will fall substantially below normal. The market is firm in every particular at the full company circular, the only cheap coal now moving being that applied on some relatively low-priced contracts which a few sellers injudiciously entered into early in the season. The selling agencies now occupy a strong position and are making little effort to force sales. The situation as regards supplies at down East points continues most discouraging.

Bituminous—Some of the high quality soft coals are out of the market entirely, while others are being partially withdrawn, and none are in plentiful supply. Consuming interests are crowding the producers in every way possible for all the tonnage they can get on regular contracts, and are also picking up any loose shipments that appear in the market. Operators have withdrawn entirely from the contract market, being unwilling to commit themselves for any time ahead, and some manufacturing interests are finding it difficult to obtain sufficient coal to meet their immediate requirements. Marine transportation in the Coastwise trade is probably even scarcer than is generally thought, and with the railroads freely predicting car shortages, the situation is causing a notable anxiety among many of the larger consumers. The export movement continues heavy.

Lake Trade—The market is distinctly firmer all along the line. Industrial consumers and railroads are becoming very urgent in their demand for coal, and it is now definitely agreed that the Lake movement to the upper ports will fall substantially below requirements, and that the deficiency will have to be made up with all-rail coal from the Middle Western section. In the meantime there is a very sharp bidding for vessel capacity, but in spite of offers at record high levels, very few cargoes are being placed. The severe West Virginia flood, eliminating production estimated at 30,000 tons per day, proved very disconcerting at this time when mines were being crowded to their full capacity. It is further understood that shipments out of the flooded regions are liable to be considerably handicapped for some time, pending reconstruction of railroad lines. The movement is generally so slow that dealers are placing practically unlimited orders, feeling confident they will be able to handle all of the coal they can get.

Middle West—Predictions of a heavy demand and high prices for the season are being realized earlier than anticipated, indications already pointing to the strong possibility of a runaway market when the fall trade gets under way. The improvement is due primarily to the possible eventualities of a railroad strike, and also in a large measure to ordering on the part of the dealers, who are now finding that they are compelled to meet substantially higher prices. The great scarcity of the steam sizes continues the leading factor in the situation, these grades showing a direct reversal of form as compared with preceding seasons. The only weak branch of the trade lies in the South, prices in that direction ruling substantially below other sections of the country. As a rule, unbilled coal has been generally cleaned up, and working schedules at the mines are up to the full limit of the car supply. It is generally understood that any protracted cessation of transportation facilities will result in a shut-down at many large industrial plants.

A Year Ago—Full winter schedule on anthracite now at hand, and business will slow down pending cooler weather. Indications of a stiffening in bituminous. Inquiries from Great Britain. Retail buying gaining momentum at interior points.

Business Opinions

Iron Age—Pig iron rather than steel has been the market leader of the week. The spectacular orders for shell and other war steel, with deliveries running six to ten months ahead, having been put on producers' books, interest in the steel trade centers on the balancing of supply and demand in the domestic market for the first half of 1917. Yet it is evident that the Allies want much more steel from the United States. Many orders now on the books of leading steel companies for this year's delivery must go over to 1917. Weeks of almost unbroken hot weather have aggravated an oversold condition, and consumers have not yet felt the full effect of this exceptional curtailment.

Boston News Bureau—The situation continues a most interesting one. Much depends upon a person's make-up, as to whether he is a radical optimist, a conservative or a pessimist. Attention continues riveted on Washington. While nothing definite has yet resulted from the conferences with the President, the belief increases that some way will be found to avoid a strike which will be accepted by both sides. It is the best and general opinion that the country could not today stand for a strike.

Export Business—Exports from New York were at a record-breaking point in July. Shipments of munitions, and other goods to the Allies, together with general merchandise for neutrals brought the grand total of domestic exports to $241,362,058, compared with $154,249,996 in July, 1915. Foreign exports, largely Canadian wheat and other products, were valued at $2,442,571. Foreign gold imports in July jumped to $17,880,968, compared with $1,354,189 in July, 1915.

American Wool and Cotton Reporter—There has been little change in the wool market in the last week. The bulk of the business is in fine staple territory wools, for which an increasing demand is reported. Ohio delaines and other fleeces do not figure largely in the sales, although samples are being sent out to inquirers. Good staple foreign wools are scarce.

Marshall Field & Co.—Current wholesale distribution of dry goods continues to run well ahead of the corresponding period of a year ago. The volume of road sales for immediate, fall and spring deliveries has been considerably in excess of the same week in 1915. Customers have attended the market in much larger numbers than during the same period last year. Collections for the week were exceptionally good. The market on domestic cotton goods is strong.

Bradstreet—Activity in trade, manufacturing, railway traffic, coal and other mining, shipbuilding and water-borne transportation continues notwithstanding the existence of such uncertainty-making factors as the railway labor situation, reports of wheat and corn-crop damage and further advances in prices of many staples. It is true that anxiety regarding the railway labor dispute has promoted a conservative attitude in some parts of the country, though at the same time having beneficial effects in other sections.

Dun—It is still noteworthy that existing uncertainties have scarcely a discernible influence on the course of legitimate business, which, with few exceptions, reflects sustained activity and in some of its more important branches shows further augmentation. Distinct gains appear in steel and iron and in copper, as well as in dry goods, and it is significant of conditions in widely divergent lines and sections that producers are either not in a position or are disinclined to accept all the contracts offered. Commercial failures this week in the United States, are 352 against 275 last week, 274 the preceding week, and 354 the corresponding week last year.

Dry Goods Economist—The number of buyers in the New York market this week has been almost unprecedented. Many of them are representatives of women's garment departments or specialty stores who had delayed coming to the market on account of the recent cessation of work in the city's suit and coat industry. Among the important developments of the week are the firmer tone and, in some instances, the higher price of cotton fabrics. It was announced that after selling a limited quantity at 9½ cents the price of 4/4 Fruit of the Loom bleached would be advanced to 10c., with the guarantee that it would not go below that figure prior to Nov. 15.

ATLANTIC SEABOARD

BOSTON

Pocahontas and New River very strong; spot sales not attractive and most shippers confine themselves to contracts. Georges Creek in still shorter supply. Pennsylvania grades firmer. Anthracite deliveries still farther behind.

Bituminous—The Hampton Roads coals are in very firm position. What little spot coal is let out sells at new high levels, $3.50 being the present asking price for quick coal. Loading dispatch continues about the same as a week ago, but it would have grown worse had not most of the agencies held themselves down to vessels reporting on contracts, leaving current demand to be supplied elsewhere. Export cargoes are still loading in heavy volume but the tonnage coastwise shows relatively no increase. Neither is there any gain in output, the Southern fields having the same shortage of labor to reckon with as the Pennsylvania districts. The smokeless coals are certain to be in very strong demand the balance of the year.

This territory is still in arrears on receipts of Pocahontas and New River. Every consumer with a contract is pounding his shipper for deliveries, and if the truth were known there are some very heavy steam users who are running on very small margins of coal in storage. The lack of marine transportation is greater than most buyers have realized, and even the steam tonnage brought from the Lakes is not sufficient to make up the deficit.

Prices on cars at Boston and Providence continue firm, with distributors less and less disposed to make quotations for delivery more than a few weeks in advance. With a car shortage freely predicted and stocks only moderate, steam-users are bringing pressure to bear on factors at the distributing points. With the outlook so dubious in August it is hard to figure any improvement for fall and winter.

The Georges Creek shippers are able to do less and less for this market. In spite of all efforts to accumulate coal at the loading piers, more than one bottom has had to be diverted elsewhere because of the poor prospect for loading. Delays only increase and deliveries all-rail and even to some of the Tidewater ports have practically ceased. There have been virtually no spot sales of this grade for several weeks, and now only dribbling amounts are available on contract.

The market for Pennsylvania steam coals is gradually broadening with the increasing scarcity in other grades. For the more popular varieties the demand, while not as yet for large tonnages, is such as to make prices almost buoyant, with $2 as a maximum for the present. A number of operators are declining all further business that calls for delivery beyond Jan. 1.

Bituminous quotations at wholesale, f.o.b. loading ports at points designated, are about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.40@3.00	$2.70@3.30	.....	$1.15@1.75
Cambrias and Somersets	2.70@3.15	3.00@3.45	.....	1.45@2.00
Georges Creek (contract)	3.07@3.17	3.37@3.47	$3.00@3.10	2.00@2.10

Pocahontas and New River, f.o.b. Norfolk and Newport News, Va., are $3.15@3.50. On cars Providence and Boston prices are $5.25@5.35 for small lots. There is a rumor of one cargo selling at $6 alongside Boston.

Anthracite—Buyers in this territory are much discouraged over the extension of "button strikes" in the anthracite region. Just when coastwise movement is improving the supply at the loading ports is being curtailed. Broken and the buckwheat sizes are increasingly hard to get, particularly from New York, and the domestic sizes are not in any too comfortable supply.

Boston retail prices were advanced Aug. 21, 25c. per net ton of 2,000 lb. making the new schedule as follows: Broken, $7.25; egg, $8; stove, $8.25; nut, $8.25; pea, $6.25; Shamokin, $8.50; Franklin, $9.50.

NEW YORK

Anthracite output restricted by numerous small strikes, and coal is scarce. Steam sizes in fair demand. Bituminous consumers endeavoring to accumulate some surpluses. Spot prices for free coal command fair premiums.

Anthracite—This week finds anthracite demand considerably stimulated. There is good inquiry from the all-rail trade, with a stronger tendency showing in the Tidewater markets. The trade is now appreciating the grave difficulties that the mining companies are having in the way of increasing production; outputs are most radically reduced in certain regions owing to miscellaneous strikes. In the Shamokin region the strike of about 15,000 miners, which started on Wednesday of last week, still continues.

Both stove and egg are very scarce and current shipments are eagerly absorbed. Even chestnut coal is in much better demand and concessions in price are now becoming rare. There is also a noticeable tightening up in the supply of pea coal.

Steam sizes are in fair demand, with best grades in short supply for spot sale.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$4.95	.....	Pea	$3.90	$3.80@3.90
Egg	5.35	$5.35	Buck	2.75	2.50@2.75
Stove	5.55	5.55	Rice	2.20	2.00@2.20
Nut	5.65	5.55@5.65	Barley	1.95	1.85@1.95
			Boiler	2.20	

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—Shortage of cars and labor restrict bituminous production. Many contract consumers are trying to obtain increased supplies on regular contracts. Mine prices this week are much stronger than at Tidewater, producers asking $1.60 to $1.65 for Pennsylvania coals that sold several weeks ago at $1.35 to $1.40. Car supply was very short on certain sections of the Baltimore & Ohio last week, with the Pennsylvania also unable to supply all the cars its shippers needed.

Supplies of coal at Tidewater ports are small and would be inadequate for immediate shipping orders were boats obtainable. Tidewater prices are very firm if not slightly increased over last week. Gas coals are in short supply for spot shipment. Mine quotations are stronger.

Current quotations are on the following basis:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.50@3.65	$3.50@3.65	$3.50@3.65	$1.95@2.10
Georges Creek Tyson	3.10@3.30	3.10@3.30	3.10@3.30	1.55@1.75
Clearfield: Medium	3.00@3.20	3.00@3.20	.....	1.40@1.55
South Forks	3.30@3.50	.....	.....	1.75@1.95
Nanty Glo	3.15@3.25	.....	.....	1.60@1.65
Somerset County: Medium	3.05@3.10	3.00@3.10	3.00@3.10	1.50@1.55
Quemahoning	.....	3.10@3.25	3.10@3.25	1.60@1.70
West Virginia Fairmont ¾	.....	3.15@3.25	3.10@3.20	1.40@1.50
Fairmont mine run	.....	3.00@3.10	3.00@3.10	1.20@1.30
Western Maryland	.....	2.95@3.00	2.95@3.00	1.40@1.45

PHILADELPHIA

Anthracite retail trade dull; wholesale business brisk. Egg, stove and pea active, with chestnut showing some strength. Buckwheat in demand, but other steam coals slow. Bituminous in strong demand and scarce. Prices increase.

Anthracite—The present is a dull time for the retailer, but the wholesale shippers are enjoying the brisk times anticipated. The rapid approach of the maximum prices of the year, effective Sept. 1, together with the possibility of a railroad strike has stimulated business. Orders in the hands of the shippers are also greater than they can fill due to the shortage of labor.

Practically the entire production is being absorbed and the summer's business has been fully as remarkable as was predicted. In addition to this there has been less cutting in prices than in any recent years. Now and then an individual operator has been forced to make concessions to avoid demurrage charges, but in no instances this week were these sales allowed to be taken as a precedent. The only really cheap coal in the market is that being applied on orders taken in June for shipment throughout the summer season.

In spite of the fact that pea coal is holding its price strongly, it has been in a way a disappointment to the big shippers, as the buyers still hesitate to fill their bins. Sales are increasing, but not to the extent expected by the large companies though the individuals report that they cannot take any further orders for August on this size. We know of one block of pea coal sold within the past fortnight at $2.50, or 30c. less than circular, but the shipper states that he will sell the same buyer $3 pea coal before the first of the year.

Egg coal is firm and continues in strong demand, due partially to the constant call from New England.

Stove coal requisitions have shown no weakness all year, nor is it at all likely that there will be any surplus before next March. This size is expected to be short with both the shipper and retailer all winter. Chestnut appears to be gaining some strength, although very slowly and is the only one of the prepared sizes causing any trouble to sell. Surpluses carried over from last year are now being regarded with satisfaction.

Retailers are complaining about collections more strongly. If the truth were known it is probable that lack of funds has had a great deal to do with the slow buying of pea coal, as well of all other sizes. For several weeks past the salesmen have been endeavoring to impress upon the dealers the like-

lihood of a shortage of coal this winter on account of a dearth of labor.

Buckwheat continues to lead among the steam coals, but the other sizes still lag, despite the special efforts of salesmen to move rice, boiler and barley, hoping to take advantage of the rise in price and scarcity of bituminous coal.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.75	Buckwheat	$1.65	$2.55
Egg	4.05	5.15	Rice	1.00	....
Stove	4.30	5.50	Boiler	.90	1.80
Chestnut	4.40	5.45	Barley	.75	....

Bituminous—All grades of soft coal continue in good demand, while prices are stiffer, except on the Fairmont grades. The increases are not large, but they bear out the prediction long made that high prices will soon be reached in all grades. Conditions are such at this time, both as to advancing prices and slow deliveries, that there are practically no contract figures being quoted, very few houses being willing to accept business now on that basis. Many of the large manufacturing plants which were endeavoring to stock some fuel are now finding it difficult to keep up with current consumption. The prices per gross ton f.o.b. cars at mines are ruling about as follows:

Georges Crk. Big Vein	$1.95@$2.05	Fairmont gas, mine-run	$1.45@$1.65
South Fork Miller Vein	1.95@ 2.00	Fairmont gas, slack	1.25@ 1.30
Clearfield (ordinary)	1.45@ 1.55	Fairmont lump, ordinary	1.40@ 1.50
Somerset (ordinary)	1.45@ 1.55	Fairmont mine-run	1.25@ 1.35
West Va. Freeport	1.35@ 1.40	Fairmont slack	1.25@ 1.30
Fairmont gas, ¾	1.60@ 1.70		

BALTIMORE

Market tight with some of the better coals now entirely out. Prices advancing. Bunker trade playing big feature. Exports lessen.

Bituminous—The soft-coal market here has grown tighter during the past week, and there are no longer quotations made on certain fuels. Big vein Georges Creek is apparently not to be obtained at any figure and on all other grades there are now some mines that are out of the market entirely. The railroads have been unable to keep pace even with the recent curtailed production and the past week saw the Baltimore & Ohio establish a percentage distribution.

Prices to the trade are about as follows, at the mines, per gross ton: Georges Creek, Tyson, $1.75 to 1.85; Miller vein, $1.65; Quemahoning, $1.75; Somerset, $1.55; Freeport, $1.35; Fairmont, gas, three-quarter, $1.35 to 1.40; same, mine-run, $1.25; slack, $1.20.

Anthracite—A number of hard-coal dealers here are undoubtedly nervous as to railroad strike conditions and the coal supply. Deliveries from yard stocks are being delayed in many cases pending settlement of the dispute. In addition the supply from the mines is not up to requirements. There was complaint of shortage of shipments on practically all sizes except nut coal.

HAMPTON ROADS

Exports active. Coastwise shipments fair. Congestion of vessels relieved. Stocks still below normal. Prices firm.

Shipments foreign continue in unabated volume. Reports from British coal ports indicate a shortage of coal with more or less trouble with the miners in regard to holidays and demands for increased pay from trimmers. The chartering of several foreign sailing vessels have been reported, and these, together with our American schooners account for a respectable tonnage.

The coastwise market is in healthy shape and shipments are fair. Freight rates from Hampton Roads are firm around two dollars although some tonnage is carried at a lower rate on contract. The bulk of the shipments, both coastwise and for export, are Pocahontas and New River. There have been several part cargoes of high volatile coal recently shipped to the West coast of South America, usually Chile or Peru. The congestion of vessels, of the past few weeks, has now been overcome and dispatch is normal.

Ruling quotations are for Pocahontas and New River $3@3.25 per gross ton for export and coastwise shipment, $2.85@3 per net ton on tracks, $3.30 per gross ton, plus 10c. per ton trimming for bunker delivery. Anthracite $7.50 per net ton delivered.

Railroad Tonnages—The following is a comparative statement of the tonnages handled by the different roads for the weeks ended Aug. 19, 1915-16 and for the first 8 weeks of the last half of the years:

	Week		8 Weeks	
	1915	1916	1915	1916
Norfolk and Western	172,546	181,638	1,431,590	1,265,010
Chesapeake & Ohio	129,826	101,443	781,679	775,984
Virginian	77,136	84,967	525,089	723,193
Total	379,508	368,048	2,738,358	2,764,187

Ocean Charters and Freights

FREIGHT RATES

During the past week, freight rates on coal to Rio declined very materially as there were a number of large British steamers that were obliged to make this voyage, which boats accepted $14 net, with 1,000 tons a day discharge, upon which terms additional steamers are offered. Rates to the Mediterranean are unchanged, but rates to Cuba and nearby ports are much firmer, owing to the complete absence of all homeward business.

We would quote freight rates on coal by steamer as follows:

West Coast of Italy	$27.60@28.80	Cienfuegos	$5.25 about
Marseilles	26.40 about	Port au Spain, Trinidad	5.50 about
Barcelona[2]	24.00 about	St. Lucia	5.50 about
Montevideo	15.00 about	St. Thomas	5.00 about
Buenos Aires	15.00 about	Barbados	5.50 about
Rosario	15.60 about	Kingston	5.25@5.50
Rio Janeiro	13.50@14.00	Curacao[1]	4.75 about
Santos	14.00@14.50	Santiago	5.25@5.50
Chile (good port)	8.00@9.00	Guantanamo	5.25@5.50
Havana	4.00 about	Bermuda	4.25@4.50
Cardenas or Sagua	5.00@5.50	Vera Cruz	6.00 about
		Tampico	6.00 about

[2] Spanish dues for account of cargo. [1] And p.c. [3] Or other good Spanish port.

Note. Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battie & Co.'s Coal Trade Freight Report.

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes during the past week:

NORFOLK

Vessel	Destination	Tons
Achilles[6]	Cristobal, C. Z.	12,002
Lautaro[3]	Iquique, Chile	5,167
Belgier[4]	Marseille	7,006
Corinthia[7]	Nassau, Bahamas	275
Mathilda[5]	Rio de Janeiro	6,070
S. Theodore[1]	Savona, Italy	7,607
Providenza[1]	Catania, Italy	1,971
Angola[3]	Lisbon, Portugal	6,189
Olaf[6]	Para, Brazil	2,670
Maryland[4]	San Juan, P. R.	2,694
Riversdale[4]	Marseilles	5,795
Maria C[1]	Genoa, Italy	2,315
H. O. Barrett[4]	Lisbon, Portugal	2,442
Atlantis[8]	Kingston	1,291
Luckenbach[3]	Rio de Janeiro	2,759
Berwind[4]	San Juan, P. R.	2,944
Ulysses[8]	Cristobal, C. Z.	12,000
Geddington C.[9]	Bahia Blanca	5,830
Imperator[10]	Georgetown, B. G.	1,016
Carmen[11]	Italy (any port)	7,293
Normannia[5]	Naples, Italy	3,718

NEWPORT NEWS

Am. Transport[2]	Havana, Cuba	7,720
Jethou[2]	Rio de Janeiro	5,837
Margaret[2]	Rio de Janeiro	1,949
Bris[2]	Bahia, Brazil	1,550
Mexico[2]	Fort de France	3,093
C. Radcliffe[12]	Genoa, Italy	8,794
Aries[13]	Buenos Aires	4,182
Thalassa[2]	Buenos Aires	2,188
Alaskan[2]	Valparaiso	11,800

PHILADELPHIA

Vessel	Destination	Tons
Ereaga[2]	Tarragona	
Heina	Havana	
Skogstad	Fort de France	2,357
Chamberlain	St. Johns, N. B.	
Vitalia[2]	Vera Cruz	
Evelyn	Antilla	
E. F. Bartram	Rio de Janeiro	920
Perceler	Nassau	255
Munalbro	Havana	
Josey	Havana	
A. J. Trainer	Halifax, N. S.	

BALTIMORE

Angiolina	Spezia, Italy	4,810
John Bakke	Guantanamo, Cuba	2,081
M. E. Palmer	Nice, France	2,021
Tenynan Mary	Santos, Braz.	4,317
J. J. Cuneo	Port Antonio	.50

[1] Pocahontas Fuel Co. [2] Berwind-White Co. [3] Castner Curran & Bullit. [4] Baker-Whiteley Co. [5] Smokeless Fuel Co. [6] W. C. Atwater & Co. [7] Houston Coal Co. [8] Hasler Bros. [9] Northern Coal Co. [10] C. G. Blake & Co. [11] Flat Top Fuel Co. [12] C. H. Sprague & Son. [13] C. & O. Coal Agency Co.

OCEAN CHARTERS

Coal freight charters have been reported during the past week as follows:

VIRGINIA

Vessel	Destination	Tons	Rate
Swanley	Janeiro	2,908	$14.00
R. Forth	Buenos A.		63s. 5d.
Largo Law	R. Blanco	2,341	62s. 6d.
Elswick P.[1]	Janeiro	2,208	$15.25
Iverna	Santos	2,220	16.00

NEW YORK

F. V. Sawyer	Puerto Cabello	324

PHILADELPHIA

Name	Destination	Tons	Rate
Nucreia	Janeiro	2,872	
Loveland	Paramaribo	653	
Evelyn	Antilla		

[1] Previously announced. September loading with option to Santos $15.75.

COASTWISE FREIGHTS

From all the loading ports, transportation is scarce, but as yet rates from Hampton Roads are unchanged at $1.85 on large tonnage to Boston and $2 on smaller space. Fair-sized barges from Norfolk to Fall River and New Bedford can still be had at $1.75.

For New York loading $2.50 was paid this week to Bar Harbor, Me., on a 500-ton schooner, and $2 was asked to the Kennebec River. Barges to points south of Cape Cod have been in strong demand, particularly for anthracite; $1.25 has been paid to New Bedford, and $1.10 to Providence; $1.25 is being asked to the latter port at this writing for loading a week off. The feeling is that the trend is distinctly upward.

LAKE MARKETS

PITTSBURGH

Car shortage somewhat greater. Industrial demand for coal excellent. Prices slightly stiffer.

The shortage of cars is somewhat more pronounced and production is frequently lost at individual mines in consequence, but the total output of the district is probably equal to the best average that has lately been maintained. Lake shipments continue quite heavy but the general appraisal is that they are not up to the requirements of the Northwest and there are predictions seriously made that some coal will have to be shipped this winter by all-rail routes. It is doubtful whether Pittsburgh coal would be taken in such an event.

Industrial demand for coal is very good and practically all buyers are taking maximum shipments under their contracts. There is scarcely any demand for domestic coal. The railroads are heavy consumers, motive power being very fully employed.

The market in general shows a continued hardening tendency and sales are more often made at above the general market level than below it. There is scarcely ever occasion to press coal for sale while there is often a demand for gas coal of special grade, which brings a premium. Slack is in good demand and moves freely despite the fairly heavy production. We quote prices unchanged, but distinctly firmer: Slack, 95c.@$1; mine-run, $1.35@1.45; ¾-in., $1.45@1.55; 1¼-in., $1.55@1.65, per net ton at mine, Pittsburgh district. The circular price for mine-run continues at $1.50.

BUFFALO

Car situation bad. Orders scarce, but some shippers find it hard to get coal enough for contracts. Anthracite movement slow. Lake totals improved.

Bituminous—There is much of the old contradiction in the trade. Cars are running short, but the consumer is not anxious. Selling on single orders is difficult though the shipper is certain that there will soon be such a shortage of both cars and miners that it will be impossible to meet the demand for actual consumption.

The Canadian demand is improving, but it is next to impossible to get men there to handle coal or anything else. Canada has money, but an ablebodied man is ostracised there unless he joins the army.

Slack is scarce everywhere, mine-run not being popular in Buffalo. Quotations are as follows:

	Pittsburgh	Allegheny Valley	Penn Smokeless
Lump	$2.95	$2.75	$2.80
Three-quarter	2.85	2.60	.....
Mine run	2.75	2.50	2.60
Slack	2.40	2.30	2.60

Prices are per net ton, except east of Rochester and Kingston, Ont., where they are per gross ton.

Anthracite—Some of the leading companies are now reporting a good Western rail movement, but buying is slow everywhere. The long spell of hot weather continues and the consumer does not feel the need of laying in coal. The Buffalo distributors say that they have next to nothing to do.

The loading of Lake cargoes was more brisk during the week. Some shippers reported that they were unable to get tonnage on the previous week, but rates advanced and more business was done. The amount reported was 102,000 tons, of which 39,700 tons cleared for Duluth and Superior, 25,300 tons for Chicago, 12,000 tons for Milwaukee, 10,100 tons for Fort William, 6,200 tons for Sheboygan, 3,150 tons for Port Arthur, 1,250 tons for Green Bay and 1,200 tons for Menominee. Freight rates are varying widely, even to the same port, as most of the coal moves on contract, 45c. to Chicago, Milwaukee and Sheboygan, 65c. to other Lake Michigan ports, with the single rate now up to $1 for the most part. Lake Superior rates are 30c. to leading ports, 40c. to others.

The August anthracite circular is maintained firmly, both by regulars and independents as follows, per gross ton, f.o.b.:

Grate	$5.85	Chestnut	$6.35
Stove	6.10	Pea	5.00
Egg	6.10	Buckwheat	3.50

A reduction of 10c. per ton is allowed on all sales during the month.

COLUMBUS

Sharp advance in price of small sizes. Domestic demand increasing while steam and Lake trade are both active.

The chief feature of the trade during the past week was the increase in the demand for small sizes, which has resulted in much higher prices. Nut, pea and slack, which was selling around 70 and 80c. has increased to $1 or more, where there is an insistent demand. This is largely due to the curtailing of production as a result of the washouts in the Cabin Creek districts of West Virginia. In many cases large users of either nut, pea and slack or coarse slack have been unable to get shipments promptly.

Domestic trade is growing more active as the stocking season advances. Dealers are now placing orders more actively. Car shortage is delaying shipments to a large extent, especially from West Virginia. As a result dealers are placing orders for cars to come forward as soon as possible, believing it will be considerable time before deliveries can be made. Retail prices are holding firm and there is every indication of an advance some time in September. Shortage of labor at the yards is making it difficult to unload cars promptly.

Lake trade is active and a large tonnage is being rushed to the head of the Lakes in order to avoid all-rail shipments after navigation closes. The movement off the docks to the interior is good and little congestion has resulted. Bottoms are becoming more scarce and it is quite difficult to get any free boats at this time.

Production has been curtailed considerably by the car shortage, which is bad on eastern Ohio roads. On the Toledo and Ohio Central the supply is only about 50 per cent. of what is needed. The Hocking Valley so far has been in fairly good shape.

Prices on short tons, f.o.b. mines, are as follows:

	Hocking	Pomeroy	East Ohio		Hocking	Pomeroy	East Ohio
Re-screened lump	$1.60	$1.80	.....	Egg	$1.30	$1.35	.....
Inch and a quarter	1.50	1.60	$1.40	Mine-run	1.20	1.20	$1.15
Three-quarter-inch	1.40	1.45	1.35	Nut, pea and slack	1.00	1.05	.95
Nut	1.25	1.30	1.25	Coarse slack	.90	.95	.85

CLEVELAND

No improvement in car supply. Prices holding firm. Slack coal scarce.

With no improvement in the car supply prices in the local market remain at the same high level of the past ten days. The present indications show no prospects of any relief from the short car supply and prices will probably remain the same or show an increase. Slack continues the scarcest; it is bringing better than a mine-run price on the local market, and a still better price outside of Cleveland.

Practically all the mines are running on Lake coal and there is not enough mine-run being produced that can be screened to help the slack situation. Lake coal will move forward more freely from now on with the settlement of the strike at the head of the Lakes in view, and operators look forward to an increase in coarse-coal prices at an early date.

West Virginia coal has stopped coming into the Cleveland market, due to the strong demand for Tidewater shipments.

Following are the market prices per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack		Three-quarter	Mine-run	Slack
No. 8	$2.20	$2.10	$2.10	Youghiogheny	$2.60	$2.50	.....
Cambridge	2.20	2.10	2.10	Pittsburgh	2.60	2.50	.....
Middle Dist.	2.10	2.00	2.00	Pocahontas	....	3.05	.....
Hocking	....	..	2.00	Fairmont	....	....	.....

DETROIT

Possibility of railroad strike adds some stimulus to steam-coal trade. Domestic and anthracite in light demand. Lake shippers meet little success seeking boats.

Bituminous—With the prospect of a railroad strike impending, Detroit users of steam coal are showing more interest in the market. Jobbers and wholesalers report a slight increase in orders but say the buying is not in large volume. Most of the buyers want small sizes; nut, pea and slack take precedence and are quoted at 90c. f.o.b. mines. Mine run sells at $1.15 and three-quarter lump holds about $1.25 to $1.35.

Anthracite—Demand is light in the anthracite trade. Retail dealers have accomplished only a small proportion of the usual distribution to consumers and buying is not active. Even should there be no railroad strike, the wholesalers fear that much difficulty will be encountered by the retailers, both in getting coal and in making their deliveries when a general demand develops.

Lake Trade—Many of the Lake shippers still have considerable coal that is not under contract and the bidding for vessel capacity is active, though not very many cargoes are being placed. One shipper paid 85c. on a cargo of soft coal from Erie to Milwaukee, the highest rate so far noted. On a cargo of anthracite to Chicago, another shipper paid $1 a ton. A steamer of medium size was placed to take soft coal from Lake Erie to Port Arthur, Ont., at 50c. Shippers of iron ore are already endeavoring to close carrying contracts for the season of 1917; one vessel owner is reported to have closed a deal on the basis of $1 a ton free from the head of Lake Superior to Chicago.

CINCINNATI

Shortage due to the floods, and an increasing demand, have further strengthened the market. Car and labor situation growing acute.

Many operations in the Kanawha field will be out of the market for thirty to sixty days, as a result of the floods, while the damage suffered by the railroads will hamper the movement for some time to come. With the continued difficulty in getting anything like enough cars for a normal movement, coupled with the scarcity of labor, the coal trade is facing a difficult situation. The steam demand is growing heavier and more difficult to supply, as the domestic grades are not moving in a proportionate volume, and the curtailed shipments are a serious factor just now.

LOUISVILLE

Car supply the controlling factor. Steam coals high and strong demand for domestic grades. Deliveries slow.

The inadequate car supply is the most important factor in the current market. At present numbers of the operators are behind on contract shipments and there is a rush among the Lake trade shippers to get deliveries made before navigation closes. The industrial requirements have not been caught up with and interruptions like the Cabin Creek flood, which has temporarily cut off shipments of 30,000 tons daily, are disconcerting, to say the least.

Steam coals are high and strong, screenings from eastern Kentucky commanding up to a dollar and better, with the coarser grades a little higher. Block for August delivery, f.o.b. mines, long ton basis, is $1.60@1.85; September delivery, $1.75@2.

BIRMINGHAM

Demand increases and prices are stiffer. Car shortages restricting production.

The coal trade has assumed a much healthier tone. The demand has very materially increased during the past week and prices on steam coal have been advanced from 10 to 15c. per ton. Shortage of equipment is still a serious factor with some lines. Blacksmith coal is in healthy demand and is quoted $2@2.25 at the mines. Domestic grades have also shown some improvement and we quote below on some of the principal brands; f.o.b. mines:

	Lump	Egg
Montevallo	$3.00	$2.75
Cahaba	2.50	2.25
Carbon Hill	1.65	1.65
Black Creek	2.50	2.25

Operations at many of the mines are being greatly handicapped by car shortage and from 35 to 50% operating time is being lost in some instances from this cause. Specified contract deliveries are hard to maintain and in some instances are far behind schedule.

COKE

CONNELLSVILLE

Prompt supplies continue limited. Coke to be released by starting of byproduct ovens at Youngstown.

While there is very little demand from furnaces for spot coke the supplies are extremely limited, the great majority of shippers having difficulty in shipping their contract requirements and developing no surplus at all. Both operators and brokers are occasional purchasers to aid in filling contracts and the market is thus readily maintained at the relatively high level recently reached. There is no interest whatever in contract coke, either for the remainder of this year or for the first half of next year. Both producers and consumers feel that there is more likelihood of prices declining than advancing as time passes.

There is one favorable influence from the standpoint of operators, the strong market for raw coal which may result in the coke region being able to sell coal at satisfactory prices despite the freight disadvantage. On the other hand as cooler weather arrives the men are expected to work harder and output should materially increase. In relation to the number of ovens the operators are endeavoring to operate full time the actual output is curtailed 5 to 10% on account of the indisposition of men to work full time.

A more important influence in the coke market is the prospective increase in byproduct coke manufacture. Last week the Youngstown Sheet & Tube Co. commenced operations at two batteries of its byproduct ovens, at Youngstown, and it expects to start the remaining two batteries this week or next, making 204 ovens. This company has been receiving about 70,000 tons of Connellsville coke a month for its four blast furnaces, one operator having the contract for two stacks and two other operators contracts for one stack each. These contracts turn into coal contracts when the coke is no longer required. Between one-fourth and one-third of the ovens involved will be blown out, in order to ship the coal, but the other ovens can be kept in blast even though coal is to be shipped, and thus 35,000 tons a month or more of coke is to be released for a market that while strong at present does not appear to have much absorbing power. We continue to quote: Spot furnace, $2.75@2.85; contract furnace, nominal, $2.50; spot foundry, $3.25@3.50; contract foundry, $3.25@3.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Aug. 12 at 403,340 tons, an increase of 9,140 tons, and shipments at 401,577 tons, an increase of 7,530 tons.

Buffalo—The market is firm at former advances. Shippers of coke are eager to secure Lake tonnage and the outlook is for continued heavy trade. Best 72-hr. Connellsville foundry sells at $5.25, furnace at $5, high sulphur at $4.40 and stock coke at $4.25.

Chicago—The coke trade continues strong. Byproduct ovens make no progress in reducing accumulated orders, and circular prices mean nothing since all sizes are selling at a premium. Foundry sizes were very active this week. Nominal prices per net ton, f.o.b. cars Chicago, are as follows: Connellsville, $6@6.25; Wise County, $6@6.25; byproduct foundry, $6@6.25; byproduct domestic, $4.95@5.30; gas house, $4.50@4.75.

Birmingham—Coke is in heavy demand with no signs of an early diminution of requirements, which are much in excess of production. All available ovens are in blast. A good tonnage of foundry coke is going to Texas and Pacific Coast territory. Shipments are also being made to the Cananea Consolidated Copper Co. in Northern Mexico. Equipment is hard to obtain for foreign business. We quote furnace coke at $3.25@3.50 and foundry $4.25@4.50 ovens.

MIDDLE WESTERN

GENERAL REVIEW

Increased activity in all quarters. Retailers buy more freely. Steam coals maintain advanced position. Smokeless mine-run strong.

An improved tone is noticeable in the coarse domestic sizes due to more moderate weather, possibility of a railroad strike, and the conclusion reached by a great many dealers that their dilatory ordering if continued will cost them heavily later. Prices on all the major sizes remain firm. Substantial reductions in the amount of coal on mine sidings is reported. Slightly more active demand for steam coals, particularly the finer sizes, is noticeable. Considerable anxiety is shown by some industrial establishments who have neglected to provide storage coal and should railroad operations be suspended for any length of time a number of these plants will be obliged to close down.

Western mines have enjoyed increased running time this week. Accumulated unbilled coal on hand at southern Illinois mines has disappeared almost entirely, and some of these operations are now beginning to run behind on their orders. Retailers have in some cases placed large orders for immediate shipment, and urgent calls for steam coals are frequent.

Movement of smokeless mine-run is very slow to this territory, and it is causing anxiety among some of the retailers. All Eastern coals have been slow in reaching Western markets this week, particularly splint. Circular prices on all domestic grades are being rigidly adhered to, and prices show advancing tendencies. Car supply is tightening up on all roads.

CHICAGO

Fear of railroad strike increases buying of all sizes. Prices quite strong. Screenings in urgent demand.

Franklin County mines have been producing maximum output this week, and there is a very strong upward tendency in prices. Screenings are active and considerable tonnage has been sold to large buyers in Chicago at around $1 per ton. Williamson and Saline County mines are now running behind orders.

Indiana production is gradually increasing. Many contracts at higher prices for supplying public institutions with winter supplies for August and September deliveries have been executed. Steam coal shipments have increased, notwithstanding the shortage of cars and men. Buyers have been placing orders this week fearing that their supply will be cut off. Indiana screenings have been averaging $1 per ton

for several days past. Knox County mines are well sold up for a week or ten days ahead on fine coal.

Smokeless mine-run has been exceedingly strong, some large buyers having come into the market.

Splint producers are in a better technical position than for several years past. Lake demand has been strong, labor scarce, car supply inadequate, and they have been shipping most of their product readily without trouble. Spot prices are generally higher than contract figures, and Lake prices have been better than ever before.

Hocking Valley domestic lump has been in strong demand this week at around $1.75.

Kentucky steam business shows more activity but less has been stored this year than for several seasons past. Heavy sales have been made this week at around $2.10.

Anthracite trade has been more satisfactory due to fear of retailers that there may be an interruption of transportation. Independent shippers report that they are getting circular prices. Household buying has been a strong factor this week in creating a brisker demand.

Quotations in the Chicago market are as follows, per net ton, f.o.b. cars mines:

	Williamson and Franklin Co.	Springfield	Carterville	Clinton	Knox and Greene Cos.
Lump	$1.65@1.75	1.55@1.70	$1.65@1.75	$1.60@1.75	$1.60
Steam lump	1.35@1.45	1.25@1.35	....	1.35@1.50	1.30@1.35
2½ and 3-in. lump	....	....	....	....	1.50
1¼-in. lump	....	....	....	1.40@1.50	1.40@1.50
Egg	1.65@1.75	1.25@1.35	1.65@1.75	1.50@1.60	1.40@1.50
Nut	1.65@1.75	1.25	....	1.45@1.65	1.35
No. 1 washed	1.65@1.75	....	1.65@1.75	....	....
No. 2 washed	1.55	....	1.00	....	....
No. 1 nut	1.65@1.75	....	....	....	....
No. 2 nut	1.45@1.55	....	....	....	....
Mine-run	1.25	1.15	....	1.20@1.25	1.15
Screenings	.95@1.05	.90@ .95	....	.95@1.00	.95@1.05

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump	$1.65@1.75	$1.75@2.25	$1.85@2.10	$1.75@2.00	$1.70@1.80
1¼-in. lump	1.35	....	....	....	1.60
Egg	1.65@1.75	1.60@1.80	1.85@2.00	1.75@2.00	1.60@1.70
Nut	....	1.15@1.25	1.80	1.50@1.80	....
No. 1 nut	1.65@1.75	....	....	....	....
No. 2 nut	1.55	....	....	....	....
Mine-run	1.25	1.05@1.25	1.50	1.35@1.50	1.25
Screenings	.90@1.00	.95	....	....	....

Splint lump, $1.50@1.70.

ST. LOUIS

Market well cleaned up and high prices are the rule. Car shortage becoming acute. Screenings in particularly heavy demand.

The market is cleaned up of coal and every mine siding is bare. All of the lower grades are increasing in price and are in stiff demand. This is apparently due to a heavy demand from retail dealers who have been holding off on account of the weather for the past six weeks. Cars are beginning to get short on all roads. The Illinois Central, which has practically had a full supply for the last five years, has missed two full days this week and all of the other roads are in the same condition or worse.

In the Standard district prices have advanced considerably and will go a great deal higher next week. Steam sizes are exceedingly short and screenings seem to be scarcer than ever, an entire reversal of form over preceding years. Buyers expected to buy screenings at about 50c. per ton at this time instead of which they are paying 85c. to 90c. Domestic sizes are all in stiff demand.

In the Springfield district there is heavy demand for screenings from Chicago. Lump coal is moving freely to both domestic users and steam plants.

Franklin County mines are all on full time and are flooded with orders.

The market is quotable on the following basis per net ton, f.o.b. mines:

	Franklin County	Williamson	Staunton and Montgomery	Intermediate	Standard
6-in. lump	$1.75	$1.35@1.65	$1.35	$1.25	$1.10
6x3-in. egg	1.75	1.35@1.65	1.25	1.25	1.10
3x2-in. nut	1.75	1.35@1.65	1.25	1.25	1.10
No. 2 nut	1.55	1.25	1.10	1.00	.90
No. 3 nut	1.40	....	....	....	....
No. 4 nut	1.30	....	....	....	....
No. 5 nut	.70	....	....	....	....
Screenings	.95	.90	.90	.90	.85
2-in. lump	....	....	1.15	1.10	1.00
Steam egg	....	....	1.15	1.10	....
Mine-run	1.25	1.15	1.10	....	....
Washed					
No. 1 nut	....	1.75	1.60	1.60	1.50
No. 2 nut	....	1.50	1.40	1.40	1.35
No. 3 nut	....	1.40	1.30	1.30	1.30
No. 4 pea	....	1.25	1.20	1.20	1.20
No. 5 slack	....	.75	.75	.75	.75

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

The shipmets of anthracite for the month of July 1916, amounted to 5,432,878 tons, as compared with 5,103,665 tons in July, 1915. The total shipments for the 7 months ending July 31, 1916, have amounted to 38,854,543 tons, against 37,432,656 tons for the same period of 1915, the increase for this year being 1,421,887 tons.

Anthracite shipments for July and the first seven months of 1915-16 were as follows:

	July		7 Months	
	1916	1915	1916	1915
Phila. & Reading	999,736	839,554	7,322,734	6,252,825
Lehigh Valley	1,026,053	1,024,611	6,856,612	7,324,469
Cent. R.R. of N.J.	631,935	597,992	4,079,520	4,396,841
Del. Lack. & West.	844,684	542,775	5,951,642	5,111,283
Del. & Hudson	601,087	697,803	4,161,061	4,501,595
Pennsylvania	440,521	369,550	3,509,952	3,339,504
Erie	618,917	660,010	4,632,580	4,407,092
Ont. & Western	163,590	201,910	1,143,438	1,195,810
Lehigh & New Eng.	186,956	169,460	1,379,830	903,147
Deductions*	80,601		182,826	
	5,432,878	5,103,665	38,854,543	37,432,656

* Deduction: Tonnage reported by both C.R.R. of N.J. & L. & N.E.R.R.

NORFOLK & WESTERN

The following is a statement of coal handled by the N. & W. Ry. during July and the preceding three months in short tons:

	April	May	June	July
Pocahontas Field	1,442,497	1,540,624	1,616,174	1,449,384
Tug River District	343,854	374,396	348,785	321,687
Thacker District	258,659	286,491	266,362	278,701
Kenova District	74,993	86,662	78,988	77,320
Clinch Valley District	122,155	127,861	121,801	121,372
Other N. & W. Territory	2,963	3,770	4,178	3,692
Total N. & W. Fields	2,245,121	2,419,804	2,436,288	2,252,156
Williamson & Pond Creek	97,547	110,319	112,381	118,014
Tug River & Ky. R.R.	50,125	56,311	44,586	55,299
All other railroads	459,279	507,774	452,395	415,976
Grand total	2,852,072	3,094,208	3,045,650	2,841,445

Distribution of shipments for May and June follow:

	May			June		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	1,445,936	12,701	1,458,637	1,509,199	11,114	1,520,313
Tug River	374,396	1,632	376,028	348,785	1,434	350,219
Thacker	286,491	8,718	295,209	266,362	8,423	274,785
Kenova	86,662	8,616	95,278	78,988	7,056	86,044
Totals	2,193,485	31,667	2,225,152	2,203,334	28,027	2,231,361

Shipments of coke, entirely from the Pocahontas field, amounted to 134,483 tons as compared with 140,345 tons in May.

COAL EXPORTS

Exports of domestic coal and coke from the United States, and bunker coal laden on vessels engaged in the foreign trade, at the specified districts, during the month of June, 1916, were as follows:

District	Anthracite	Bituminous	Coke
Maine & New Hampshire	467	64	....
Vermont	2,917	4,537	....
Massachusetts	5	....	....
St. Lawrence	115,503	85,919	1,182
Rochester	103,490	187,346	261
Buffalo	234,271	143,714	53,384
New York	20,949	5,108	966
Philadelphia	5,822	86,928	1,051
Maryland	329	91,342	7,003
Virginia	10	535,987	4,625
South Carolina	....	17,510	....
Florida	705	....	....
Mobile	....	2,663	....
New Orleans	42	1,473	299
Laredo	....	941	630
El Paso	....	3,219	....
Eagle Pass	....	119	63
Arizona	....	2,289	7,992
Southern California	....	36	....
San Francisco	....	....	1
Washington	26	322	4,154
Alaska	....	2	....
Dakota	526	2,278	299
Duluth and Superior	....	2,112	220
Michigan	....	42,997	7,301
Ohio	30,077	848,603	404
Total	515,139	2,065,509	89,835

BUNKER COAL

Districts	Gross Tons
Maryland	50,598
New York	313,064
Philadelphia	43,418
Virginia	178,621

Financial Department

Central Coal & Coke Co.

This company reports for the year ended Jan. 1 as follows:

Department	Central Coal & Coke Co. 1916 Gross	1915 Gross	1916 Net	Del. L. & T. 1915 Net	1916 Net
Wholesale coal	$777,846	$809,188	$291,511	$392,620	.....
Retail coal	120,184	118,024	14,780	10,878	.....
Wichita coal	19,405	22,608	394	loss 934	.....
St. Joseph coal	16,019	13,868	3,711	2,521	.....
Washer	27,360	30,398	loss 1,528	loss 1,065	.....
Stores lumber dept.	.....	.....	.....	.....	34,205
Mining stores	.....	.....	86,751	127,347	.....
Rentals coal, etc., dept.	.....	.....	28,272	50,402	7,305
Wholesale lumber	110,219	120,523	36,812	43,647	439,154
Miscellaneous	.....	.....	62,980	230	30,977
Total	$1,071,033	$1,114,609	$523,684	$625,647	$511,641

INCOME ACCOUNT FOR YEAR ENDING DEC. 31

	Cent.C.&C.Co. 1916	Delta L.&T.Co. 1916	Cent. C. & C. Co. 1915	1914
Net earnings as above	$523,684	$511,641	$625,647	$1,287,922
Deductions—				
Royalty cred. coal lands	108,198	.....	126,120	126,664
Royalty cred. timber lds.	.....	368,435	.....	339,865
Deprec'n mill property	.....	.....	.....	33,987
Deprec'n washer prop.	2,672	.....	4,008	4,008
Deprec'n Kansas City motor trucks	4,544	.....	4,544	4,544
Live stk. exting. reserve	19,876	.....	11,580	.....
General expense	74,918	42,780	70,581	88,819
Interest on bonds	70,913	69,333	77,488	72,990
Interest and exchange	28,804	21,834	12,405	73,041
Total	$309,926	$539,802	$306,726	$743,918
Earnings, sur. or def.	sur. 213,757	def. 28,160	sur. 318,921	sur. 544,004
Divs. on pref. stock (5%)	93,750	.....	93,750	93,750
Divs. on com stock	.....	.....	(3) 153,750	(6) 307,500

BALANCE SHEET YEARS END. JAN. 1 (Cent. C. & C. Co.)

Assets—	1916 $	1915 $	Liabilities—	1916 $	1915 $
Coal lands	4,219,212	4,270,527	Common stock	5,125,000	5,125,000
Timber lands	1,737,130	1,737,130	Preferred stock	1,875,000	1,875,000
Coal shafts and bldg.	1,574,772	1,832,939	Gen.Cons.M.bds	1,049,000	1,161,000
Yards and equipment	100,731	99,227	Sweetwater Coal Min. Co. bonds	59,000	97,000
Personal property	123,279	142,029	Audited bills	727,310	589,973
Bev. & So. R.R.	150,000	150,000	Miscellaneous	92,631	42,486
Bonds, etc., in other companies	303,602	319,102	Pay-roll balances	91,925	104,159
Accts. for collection	1,773,126	1,848,047	Freight charges unadjusted	88,475	66,590
Inventories	245,034	276,271	Sink.fund for ins.	39,210	204,308
Cash	286,113	138,816	Bills payable	874,650	100,000
Sinking fund	.....	75,000			
Sundry balances	.....	70,550	Undivided profits	1,493,183	1,594,122
Delta L.&T.Co.	1,002,383	.....			
Total	11,515,384	10,959,638	Total	11,515,384	$0,959,638

BALANCE SHEET JAN. 1 (Delta Land & Timber Co.)

[Owning all the timber and lumber properties of Central Coal & Coke Co., which owns the entire capital stock.]

Assets—	1916 $	1915 $	Liabilities—	1916 $	1915 $
Timber lands	8,053,822	8,141,208	Capital stock	500,000	500,000
Mills, mach., etc.	1,822,026	1,372,617	1st & ref. M. bds.	2,050,500	1,950,000
Sundry accounts due	84,775	127,084	Delta Lbr. Co. bds.	624,000	750,000
Cash	33,949	30,057	Audited bills	103,072	154,496
Inventories	413,456	308,548	Bills payable	100,000	68,000
Depositsforsinking fund	132,366	117,495	Timber notes	866,000	984,500
Sundry balances	59,269	20,710	Pay-roll balances	9,196	4,162
Profit and loss	178,908	150,747	Accrued interest	21,225	24,806
			Cent.C. & C. Co.	1,002,383	316,000
			Sund. accts. pay.	18,027	22,535
			Surplus(unavail.)	5,484,168	5,493,967
Total	10,778,571	10,268,466	Total	10,778,571	10,268,466

Note—For previous annual report of this company, see Vol. 8 p. 872.

International Coal & Coke Co.

This company reports for the year ended Jan. 1, 1916, as follows:

Although the balance for the year (a loss of $4,329) is on the wrong side, it must be considered satisfactory, considering the adverse conditions under which the mine was operated, and taking into special account the additional development and the sums spent thereon.

The season's operations were begun without any railway contract for coal, primarily due to the imposition of requirements with which we were unable to comply. The general depression occasioned by the war also interfered with the other business we had secured. The difficulty above referred to has happily been overcome and we are now able to meet the railway requirements. Notwithstanding all the disabilities under which we labored, business of sufficient magnitude was obtained which enabled us to develop 635,538 tons of additional coal over what was mined and at a cost of approximately $30,000, besides supplying the necessary equipment and maintaining the efficiency of the plant.

The sum of $28,700 has been transferred from surplus to reserve account, thus providing for depletion, etc., leaving a balance at credit of $438,589.

The balance at the credit of profit and loss account is $75,341.

As it was impossible to forecast the duration of the trade depression, we obtained authority to bond the property. We are now pleased to report that sufficient orders are in hand and in sight to operate at a profit, and that for the present at least it will not be necessary to use the powers given for the issuance of bonds.

The development of the second level is now sufficiently advanced to admit of producing about 700 tons per day. The cost of the plant, etc., to develop this level was approximately $158,000, all of which has been paid out of the earnings of the mine, and had it not been for the special conditions which rendered this expenditure necessary this sum would have been available for dividends.

To keep in advance of the requirements, we have in contemplation the opening of the third level during the year 1916. We operated 151 days during the year, and employed on an average 181 men.

INCOME ACCOUNT FOR YEARS ENDING DEC. 31

Calendar Year	Profit for Year	Dividends Paid	To Surp. Account	Blance, Sur. or Def.	Previous Surplus	Total Surplus
1915	Loss $4,329	.....	.....	def$4,329	$79,670	$75,341
1914	92,841	(1%) $30,000	$60,000	sur 2,841	76,829	79,670
1913	146,829	(4%) 120,000	50,000	def23,171	100,000	76,829

BALANCE SHEET DEC. 31

Assets	1915	1914	Liabilities	1915	1914
Coal lands, rights and development	$3,159,513	$3,154,665	Capital stock	$3,000,000	$3,000,000
Plant, R.R., equip't, etc. (at cost)	882,107	880,532	Can. Bank of Comm.	33,312	
Timber rights	9,025	9,025	Acc'ts payable	5,264	
Unexpired insurance	1,393	1,696	Pay-rolls	10,460	
Warehouse stock	23,289	29,449	Royalty on coal mined	5,381	94,057
Acc'ts receivable, etc.	59,483	109,526	Unclaimed dividends	833	
Coal and coke on hand	6,641	534	Deferred credits	5,909	4,474
Cash	2,693	417	Reserves for depletion of coal lands, depreciation, &c	569,054	540,354
			Profit and loss	75,341	79,670
			Surplus	438,590	467,289
Total	$1,144,144	$4,185,844	Total	$4,144,144	$4,185,844

Metropolitan Coal Co.

The Metropolitan Coal Co., incorporated under the laws of Massachusetts, has filed with the Massachusetts secretary of state a statement of its financial condition, dated Mar. 31, 1916, which compares as follows:

Assets:	1916	1915
Real estate and machinery	$818,340	$824,042
Horses, vehicles and equipment	149,472	159,393
Mat., stock in process	356,633	438,913
Cash and debts receivable	692,117	522,025
Steamers, tugs, etc	.....	151,373
Steamships	85,000	
Securities	853,731	470,591
Good-will	400,000	400,000
Total	$3,355,296	$2,966,342
Liabilities:		
Capital stock	1,900,000	1,500,000
Accounts payable	*600,519	*729,342
Funded debt	208,000	222,000
Floating debt	446,777	315,000
Surplus	200,000	200,000
Total	$3,355,296	$2,966,342

* Including $400,000 special stock.